CONCORD
MOBILE ELECTRONICS

SERVICE MANUAL

QD100 POWER AMPLIFIER

QD200 POWER AMPLIFIER

QD400 POWER AMPLIFIER

ST50 POWER AMPLIFIER

ST150 POWER AMPLIFIER

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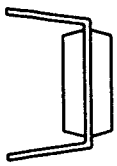
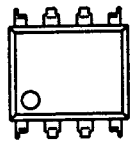
QD-100 Parts List

Part #	Reference #	Description	Quantity
		Resistors	
1-17-162	R17, R20, R39, R42, R60, R63, R81, R84	1/8W ±5% PS 62Ω	8
1-17-210	R91	1/8W ±5% PS 100Ω	1
1-17-310	R10, R32, R54, R75, R90, R92	1/8W ±5% PS 1KΩ	6
1-17-322	R87, R88, R95, R96	1/8W ±5% PS 2.2KΩ	4
1-17-330	R3, R7, R8, R18, R21, R25, R29, R30, R40, R43, R47, R51, R52, R61, R64, R68, R72, R73, R82, R85, R93	1/8W ±5% PS 3KΩ	21
1-17-368	R12, R34	1/8W ±5% PS 6.8KΩ	2
1-17-410	R11, R15, R33, R37, R55, R58, R76, R79, R99, R100, R101, R102	1/8W ±5% PS 10KΩ	12
1-17-422	R9, R14, R31, R36, R53, R74, R98	1/8W ±5% PS 22KΩ	7
1-17-427	R56, R57, R77, R78, R94, R97	1/8W ±5% PS 27KΩ	6
1-17-433	R4, R13, R16, R26, R35, R38, R48, R59, R69, R80	1/8W ±5% PS 33KΩ	10
1-17-468	R5, R6, R27, R28, R49, R50,	1/8W ±5% PS 68KΩ	9
1-17-515	R2, R24, R46, R67	1/8W ±5% PS 150KΩ	4
1-18-010	R19, R22, R41, R44, R62, R65, R83, R86	1/4W ±5% PS 1Ω	8
1-20-210	R1, R23, R45, R66	1W ±5% METAL OXIDE 100Ω	4
1-10-101	C44, C62, C94	M.CAP100V ±10% 0.1F 3Ω	
1-10-301	C19, C38, C56, C74	100V ±10% 0.001μF	4
1-10-347	C14, C17, C33, C36, C51, C54 C69, C72, C95	100V ±10% 0.047μF	9
1-10-356	C45, C63	100V ±10% 0.056μF	2
1-11-122	C6, C7, C25, C26	100V ±10% 0.22μF	4
		Electrolytic Capacitors	
1-12-010	C2, C11, C21, C30, C40, C48, C58, C66	50V ±20% 5x11 1μF	8
1-12-110	C1, C4, C5, C8, C9, C20, C23, C24, C27, C28, C39, C42, C43, C46, C57, C60, C61, C64, C75, C76, C78, C80, C82	16V ±20% 5x11 10μF	23
1-12-147	C12, C31, C49, C67, C85, C86	16V ±20% 5x11 47μF	6
1-12-210B	C13, C16, C32, C35, C50, C53, C68, C71, C84	10V ±20% 6x11 100μF	9
1-12-220	C15, C18, C34, C37, C52, C55, C70, C73, C79, C81, C83	10V ±20% 6x11 220μF	11
1-12-247	C77, C91, C92, C93	16V ±20% 8x14 470μF	4
1-12-522	C87, C88, C89, C90	16V ±20% 13x21 2200μF	4
		Ceramic Capacitors	
1-16-110	C10, C29, C47, C65	50V ±10% 100pF B TYPE	4
1-16-147	C3, C22, C41, C59	50V ±10% 470pF B TYPE	4
		IC	
1-09-421	IC1, IC3, IC5, IC7	BA4560	4
1-09-009	IC2, IC4, IC6, IC8	TA8225H	4
		Transistors	
1-07-004	TR1, TR2, TR3, TR4, TR6	9014C	5
1-07-108	TR5	MPS A13	1
		Mechanical Parts List	
3-58-004	1	2032-4 TOP COVER HEAT SINK	1
3-58-001	2	2032-1 FRONT PANEL	1
3-58-002	3	2032-2 REAR PANEL	1
3-58-003	4	2032-3 BOTTOM COVER	1
3-06-008	5	2018-8 SW. KNOB PINK	1
3-06-009	6	2018-9 BADGE PINK	1
3-60-005	7	2031-5 TERMINAL HOLDER	2
3-60-006	8	2031-6 C.W. BRACKET	2
3-60-008	9	2031-8 IC BRACKET	2
1-37-130	10	M3 FLAT WASHER ZNC	6
1-37-230	11	M3 SPRING WASHER	6
1-35-314	12	3x14 TTB-PH ZNC	6
1-33-206	13	2x6 PT BZ	4
1-44-465	14	WIRE CLIP CONNECTOR SR-6P3	1
1-35-307	15	TORX T10 TTB-PH 3x10 TIN	8

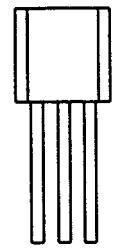
Part #	Reference #	Description	Quantity
1-35-308	16	3x10 TTB-PH TIN	2
1-35-305	17	MSB 3x6 TIN	6
1-37-230	18	M3 SPRING WASHER ZNC	2
1-37-030	19	M3 NUT	2
1-35-381	20	MSP 3x20 TIN	2
3-24-007	21	M3x7 NI BM	8
		Parts List for Package	
	22	QUAD-100 SET	
QD100-1	23	GIFT BOX	1
2032-PI	24	INNER BOX 2032-P1	1
2032-P2	25, 26	INNER BOX 2032-P2	2
1-42-202	26-1	WIRE FASTENER (BLACK)	1
1-29-106	26-2	FUSE LAMP 15A	1
1-36-120	26-3	10x5/8 PA BZ	4
1-37-150	26-4	M5 FLAT WASHER BZ	4
1-37-250	26-5	M5 SPRING WASHER BZ	4
1-50-198A	27	1625-09P1 9 POLE MALE SET	1
QD100-2	28-1	MANUAL'S OWNER	1
QD100-3	28-2	WARRANTY CARD	1
		Diode	
1-05-001	D1, D2, D3, D5, D6	IN4001	5
		Zener	
1-06-001	D4	1/2W ±5% 5.1V	1
		LED	
1-25-150	LD1	MRB31D RED LED	1
		Coil	
1-01-104	T1, T2, T3, T4	E1-19 10K:10K	4
1-01-301	T5	E1-24 NK01A	1
		Variable Resistor	
1-26-001	VR1, VR2	RK0971210047A 20KAx2	2
		RCA	
1-43-012	RCA1, RCA2	B217A 2RCA JACK (R/W) GOLD P.	2
		SW	
1-27-150	SW1	2P2T EX13EQ13	1
1-27-017	SW2	4P2T SK-42D01G6	1
		Fuse	
1-29-108A	PC1	FUSE SET	1
		Connectors	
3-24-006	CP1, CP2, CP3, CP4, CP5, CP6, CP7, CP8	1807-6 BRASS WIRE CONNECTOR	8
1-50-197A	CP9	1625-09R 9POLE FEMALE CON. SET	1
		Wire	
1-50-024	GC1	WIRE BLACK 610mm (5+15)	1

IC's, Transistors, and Measurements

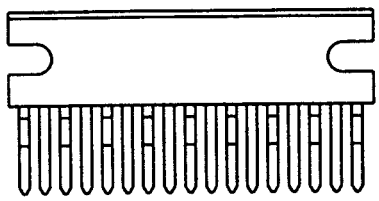




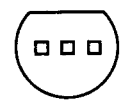
LM833
BA4560
4560D



2N3904
MPS-A06
MPS-A56
9014C
9015C



TA8225H



QUAD 100
TYPICAL AT IC PINS

MEASUREMENT REQUIRED
MEASUREMENT METER: DIGITAL MULTI METER
POWER SOURCE: DC +14.4V
INPUT: NO SIGNAL INPUT

PIN NO. / IC NO.	1	2	3	4	5	6	7	8
IC1, IC3	6.5V	6.5V	6.49V	0V	6.47V	6.49V	6.49V	11.3V
IC5, IC7	6.55V	6.55V	6.54V	0V	6.51V	6.55V	6.55V	11.3V

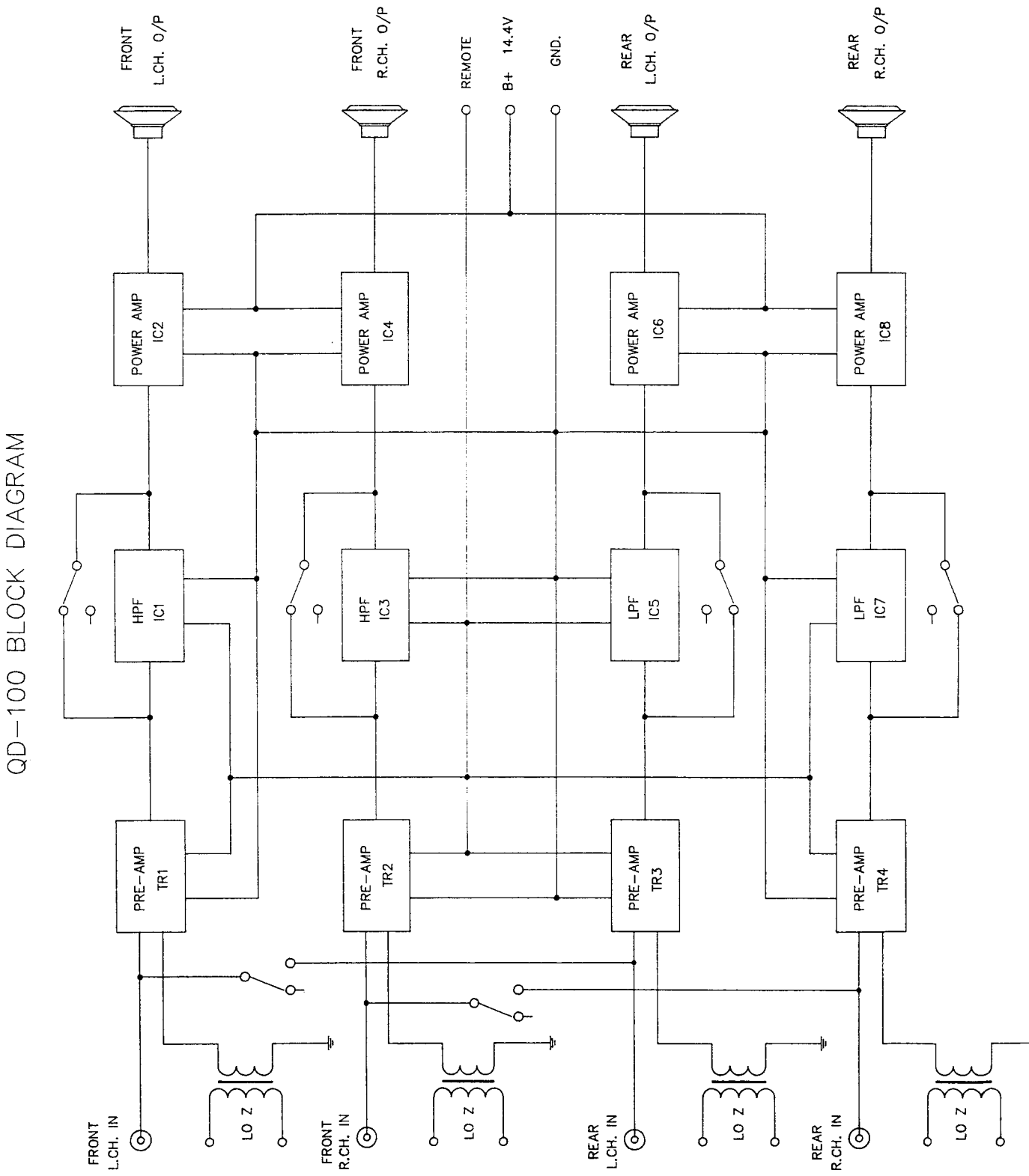
PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
IC2, IC4 IC6, IC8	5.6V	N.C.	1.9V	0V	0V	0V	1.9V	N.C.	7.3V	14.3V	7.3V	13.6V	0V	0V	13.6V	7.3V	14.3V

TYPICAL AT TRANSISTOR PINS

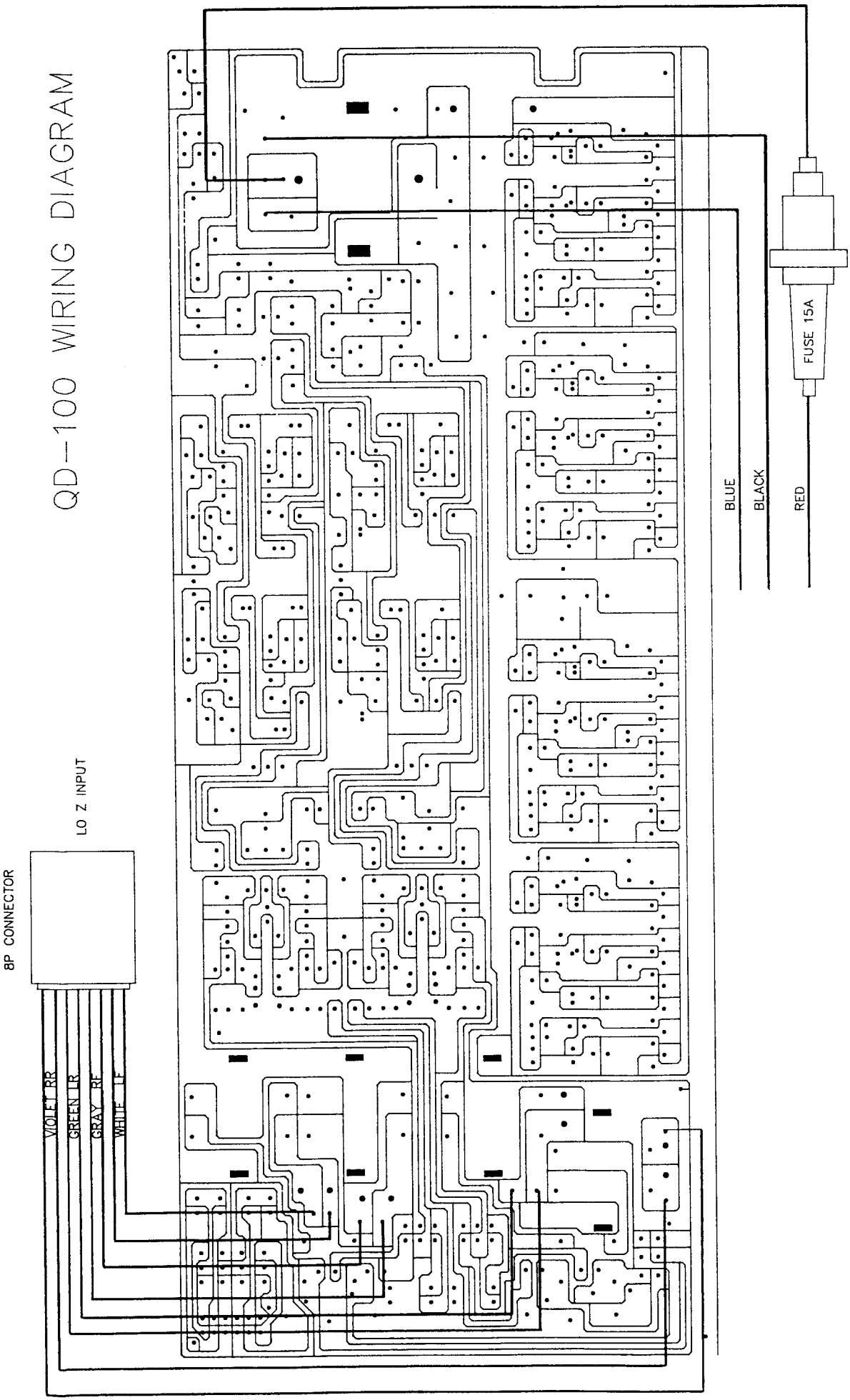
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	C	B	E
TR1, TR2	4.6V	2V	1.46V
TR3, TR4	4.6V	2V	1.46V
TR5	13.6V	13.48V	4.6V
TR6	13.7V	13.5V	12.9V

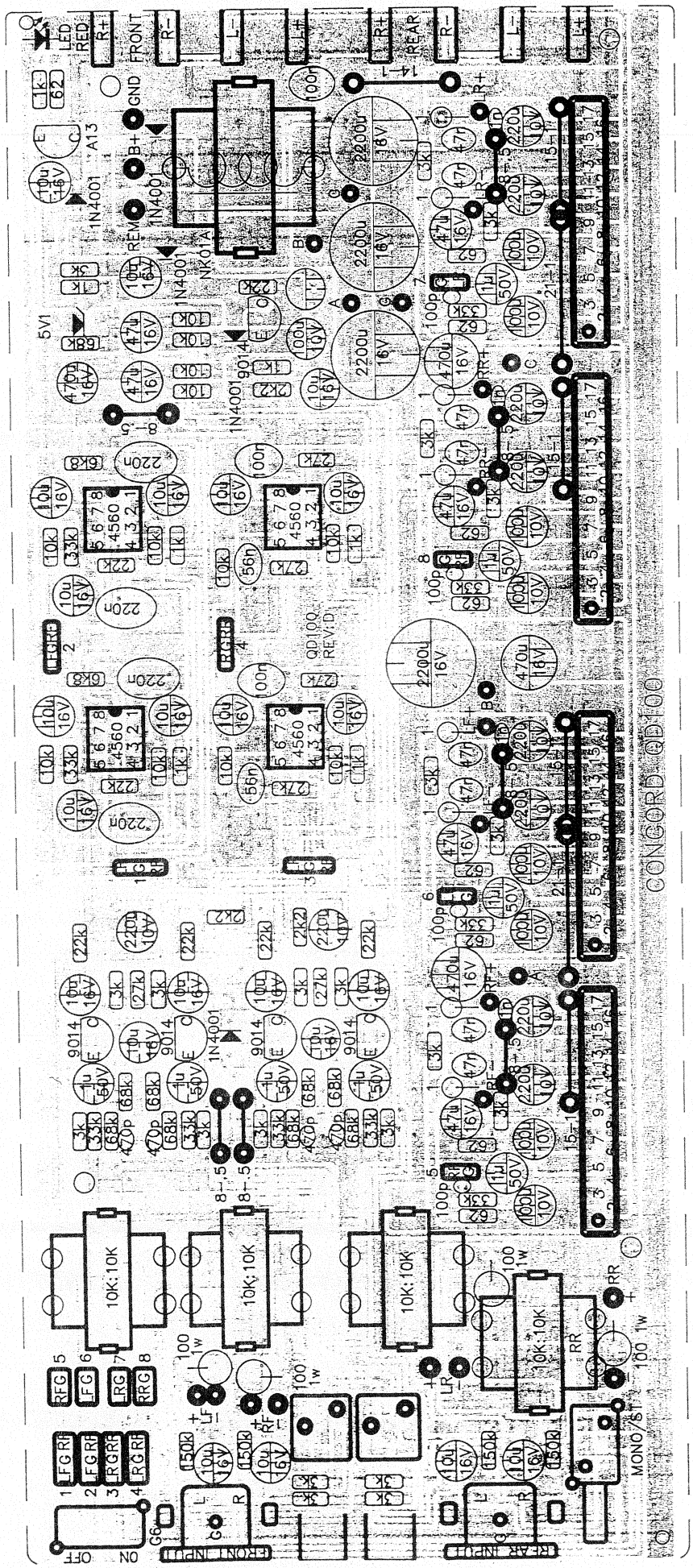
QD-100 Block Diagram



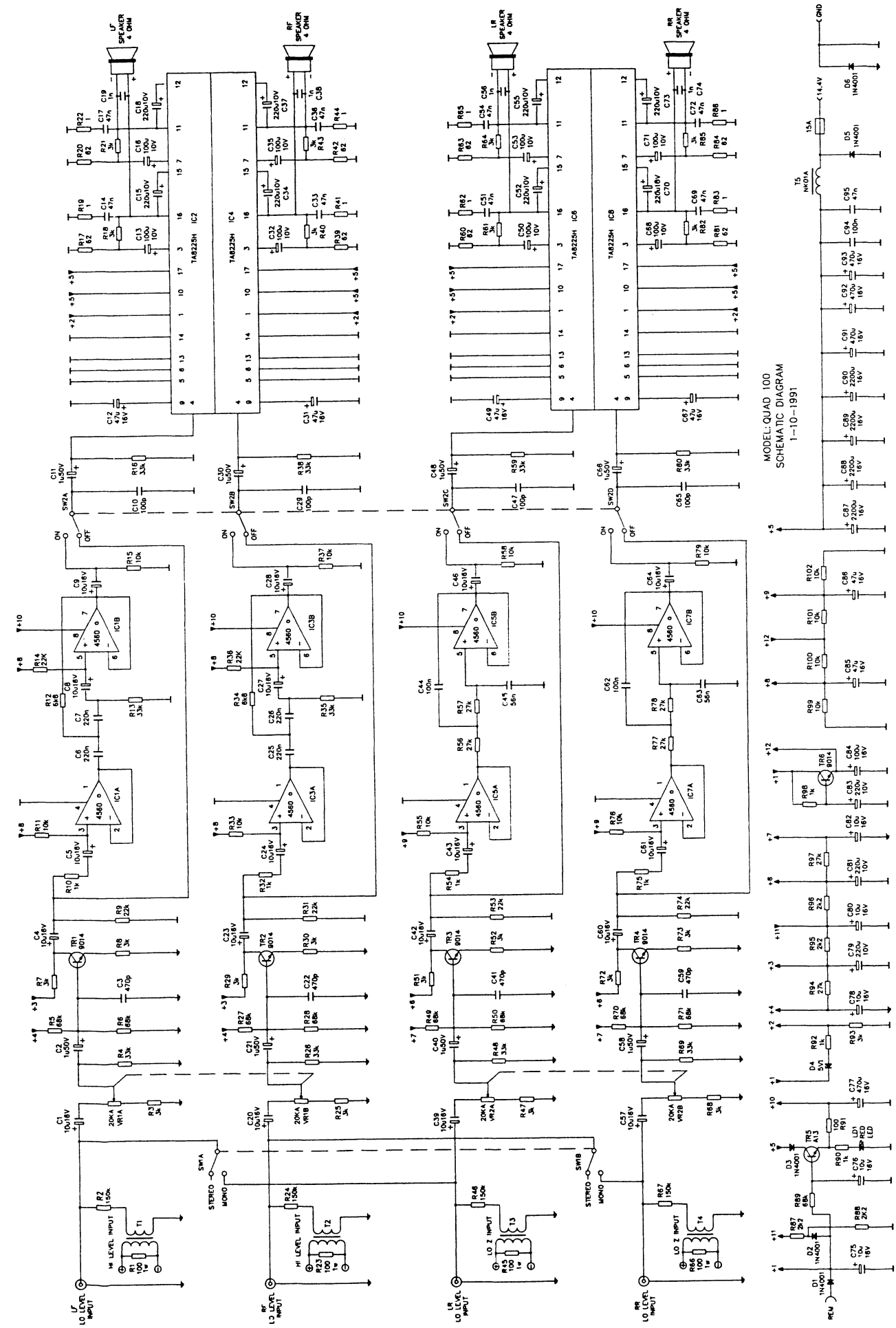
QD-100 Wiring Diagram



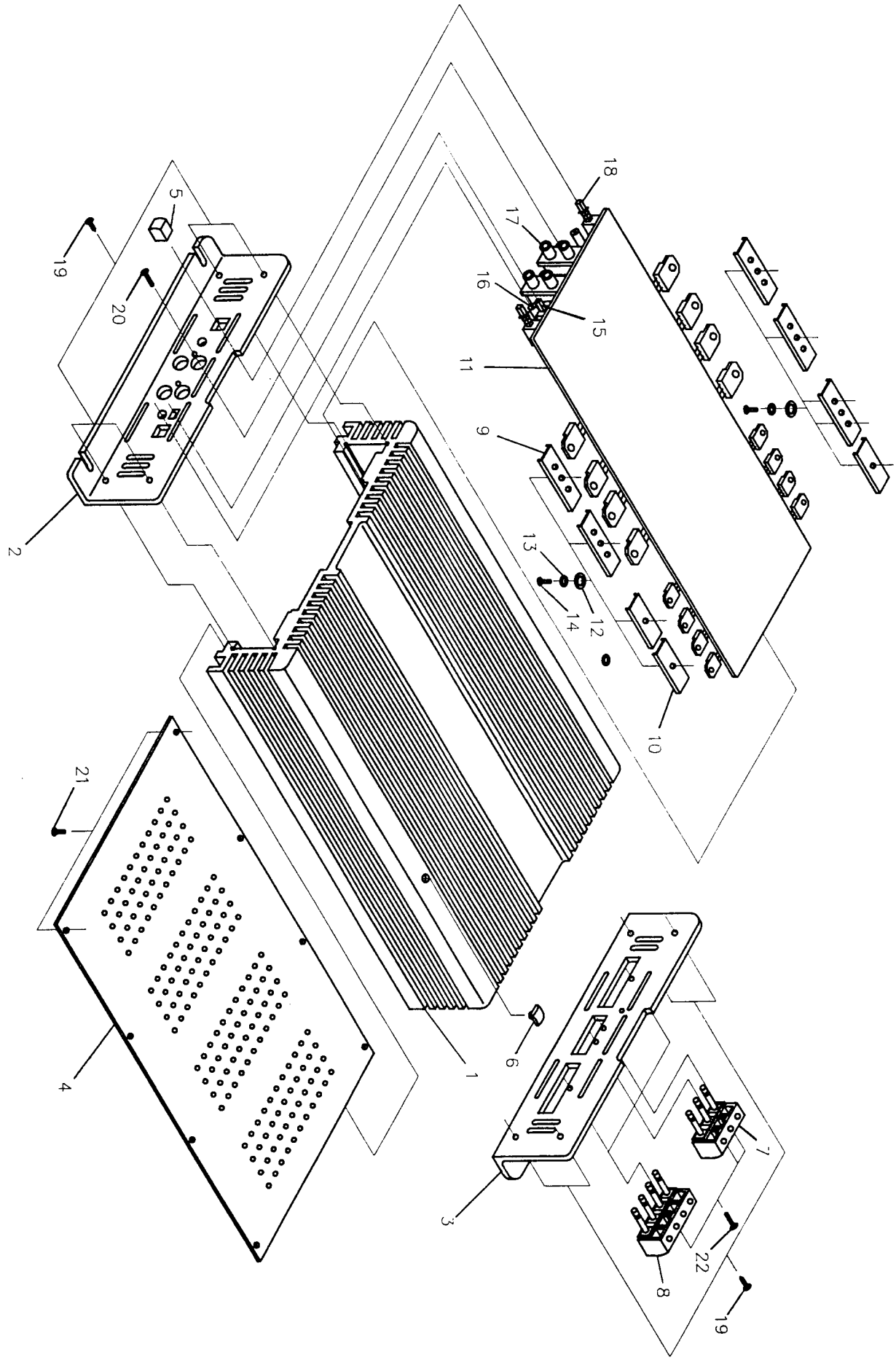
QD-100 Printed Circuit Board



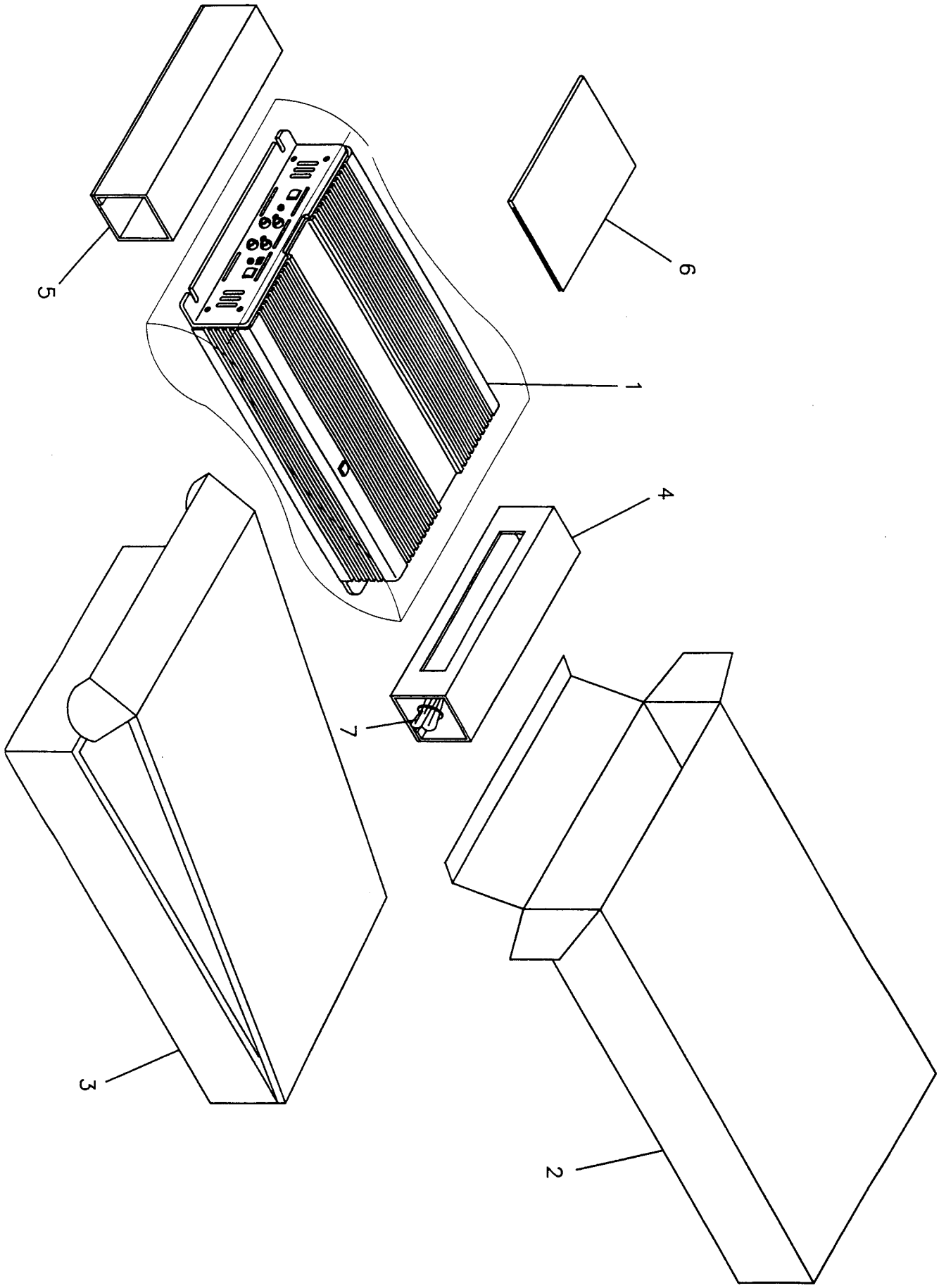
QD-100 Schematics



QD-200 Exploded View



QD-200 Package Exploded View



QD-200 Parts List

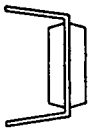
Part #	Reference #	Description	Quantity
		Resistors	
1-18-147	R139, R140, R141, R143, R144, R145, R125	1/4W ±5% PS 47Ω	7
1-18-310	R2, R12, R17, R32, R42, R47, R62, R72, R77, R92, R102, R107 R123, R124, R138, R142, R146	1/4W ±5% PS 1KΩ	17
1-18-318	R14, R44, R74, R104, R137	1/4W ±5% PS 1.8KΩ	5
1-18-322	R133, R147	1/4W ±5% PS 2.2KΩ	2
1-18-330	R16, R46, R76, R106	1/4W ±5% PS 3.3KΩ	4
1-18-333	R5, R35, R65, R95	1/4W ±5% PS 3KΩ	4
1-18-347	R23, R24, R53, R54, R83, R84, R113, R114	1/4W ±5% PS 4.7KΩ	8
1-18-351	R13, R43, R73, R103	1/4W ±5% PS 5.1KΩ	4
1-18-391	R8, R68	1/4W ±5% PS 9.1KΩ	2
1-18-410	R3, R4, R6, R27, R33, R36, R37, R57, R63, R64, R66, R67, R87, R93, R96, R97, R117, R122, R126, R127, R128, R129, R132, R121	1/4W ±5% PS 10KΩ	25
1-18-412	R1, R31, R61, R91	1/4W ±5% PS 12KΩ	4
1-18-415	R38, R98	1/4W ±5% PS 15KΩ	2
1-18-416	R15, R34, R45, R75, R94, R105	1/4W ±5% PS 16KΩ	6
1-18-418	R30, R60, R90, R120	1/4W ±5% PS 18KΩ	4
1-18-427	R131	1/4W ±5% PS 27KΩ	1
1-18-443	R69, R99	1/4W ±5% PS 43KΩ	2
1-18-456	R11, R18, R22, R26, R41, R48, R52, R56, R71, R78, R82, R86, R101, R108, R112, R116	1/4W ±5% PS 56KΩ	16
1-18-462	R134	1/4W ±5% PS 62KΩ	1
1-18-488	R10, R40	1/4W ±5% PS 88KΩ	2
1-18-510	R130	1/4W ±5% PS 100KΩ	1
1-18-547	R21, R25, R51, R55, R81, R85, R111, R115	1/4W ±5% PS 470KΩ	8
1-19-110	R29, R59, R89, R119, R135	1/2W ±5% PS 10Ω	4
1-19-210	R136	1/2W ±5% PS 100Ω	1
1-31-434	R9, R39, R70, R100	1/4W ±1%METAL FILM 43KΩ	4
1-20-110	R58, R28, R88, R118	1W ±5%METALOXIDE 10 Ω	4
1-22-002	R19, R20, R49, R50, R79, R80, R109, R110	3W ±5%WIREWOUND 0.22 Ω	8
		Ceramic Capacitors	
1-16-022	C110, C111, C112, C113	50V ±10% 22pF	4
1-16-033	C25, C75	50V ±10% 33pF	2
1-16-047	C4, C5, C24, C54, C55, C74, C15, C35, C65, C85	50V ±10% 47pF	10
1-16-122	C93, C94	50V ±10% 220pF	2
1-16-147	C2, C11, C22, C31, C52, C61, C72, C81	50V ±10% 470pF	8
		Mylar Capacitors	
1-10-201	C13, C16, C33, C36, C63, C66, C83, C86	100V ±10% 0.01µF	8
1-10-333	C8, C9, C28, C29, C41, C42, C43, C44, C59, C79	100V ±10% 0.033µF	10
1-10-368	C58, C78	100V ±10% 0.068µF	2
1-10-468	C107	100V ±10% 0.0068µF	1
		Electrolytic Capacitors	
1-12-010	C14, C34, C64, C84	50V ±20% 5x11 1µF	4
1-12-110	C1, C3, C7, C10, C21, C23, C27, C30, C51, C53, C57, C60, C71, C73, C77, C80, C45, C20, C40, C70, C90	16V ±20% 5x11 10µF	21
1-12-220	C12, C32, C62, C82, C92	16V ±20% 8x12 220µF	5
1-12-247	C6, C26, C56, C76, C105	16V ±20% 8x14 470µF	5
1-12-247	C109	25V ±20% 10x16 470µF 105c	1
1-12-522	C47, C49	35V ±20% 16x30 2200µF 105c	2
1-12-522	C95, C98, C99, C102	35V ±20% 16x30 2200µF 85c	4
		Mono	
1-14-091	C17, C18, C19, C37, C38, C39, C67, C68, C69, C87, C88, C89, C46, C48, C50, C91, C96, C100, C103, C104, C106	50V ±20% 0.1µF (EC04WD0104M)	22

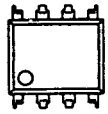
Part #	Reference #	Description	Quantity
		Coil	
1-04-010	L4, L5, L6, L7	SPRING COIL 1mmx13Ts 6.35mm	4
		IC	
1-09-421	IC2, IC3, IC7, IC8	BA4560	4
1-09-561	IC11	GL494 / TL594	1
1-09-022	IC1, IC2	LM833	2
1-09-021	IC4, IC5, IC9, IC10	uPC1298	4
		Transistors	
1-07-004	Q19	9014C	1
1-07-005	Q18	9015C	1
1-07-103	Q1, Q5, Q9, Q13	2N3904	4
1-07-107	Q4, Q8, Q12, Q16	MPS A06	4
1-07-109	Q17, Q20, Q24	MPS A56	3
		Zener	
1-06-005	D1, D8, D15, D22, D29	1/2W ±5% 15V	5
1-06-107	D33	1/2W ±5% 12V	1
		Diodes	
1-05-001	D2, D3, D9, D10, D16, D17, D23, D24, D30	IN4001	9
1-05-006	D36	IN5400	1
1-05-009	D4, D5, D6, D7, D11, D12, D13, D14, D18, D19, D20, D21, D25, D26, D27, D28, D31, D32, D34, D35	IN4148	20
		Coil	
1-01-QDA	L2, L3	D=1mm 12Tsx1 w/ T22FT25	2
1-01-QDB	L1	D=1.6mm 12Tsx2 w/ T22FT25	1
		NK045	
1-01-QDC	T1	P=1.6mm 4Tsx4, s=1.2mm 8Tsx2	1
		Rect.	
1-05-007	Q29	CTU 21R	1
1-05-008	Q28	CTU 21S	1
		Power Transistors	
1-05-200	Q21, Q22, Q23, Q25, Q26, Q27	IRF540	6
1-08-009	Q2, Q6, Q10, Q14	TIP 141	4
1-08-010	Q3, Q7, Q11, Q15	TIP 146	4
		LED	
1-25-150	LD1	MRB31D RED LED	1
		Variable Resistors	
1-26-350	VR2, VR3, VR5, VR6	SEMI-FIXED 5KR MURATA HORI	4
		Slide Switch	
1-27-016	SW4	2P2T SK-22D03G6	1
1-27-405	TH1	THERMO SW. 17AM203A5-4	1
		Panel	
3-06-014	1	2018-4 HEAT SINK L=305mm	1
3-06-001	2	2018-1 FRONT PANEL (2034-1)	1
3-06-012	3	2034-2 REAR PANEL	1
3-06-013	4	2034-3 BOTTOM COVER	1
3-06-008	5	2018-8 SW. KNOB	2
3-06-009	6	2018-9 BADGE	1
		T'nal	
3-06-015	7	2033-5 T'NAL HOLDER 3P w/DC	1
3-06-016	7A	2033-6 C.W.BKT.31.5x7.8.1mm	1
3-06-005	8	2018-5 T'NAL HOLDER 4P w/S	2
3-06-006	8A	2018-6 C.W.BKT.41.5x7.8x1mm	2
		Brackets	
3-42-010	9	1841-5 TRA.BKT. 3 HOLES	5
3-42-011	10	1841-5B TRA.BKT. 1 HOLE	3
		PCB	
3-56-001	11	QD200 MAIN BD.304x116x1.6FR4	1

S&W

Part #	Reference #	Description	Quantity
1-37-130	12	M3 FLAT WASHER ZNC	9
1-37-230	13	M3 SPRING WASHER ZNC	9
1-35-314	14	3x14 TTB-PH ZNC	9
		SL. Switch	
1-27-017	15	4P2T SK-42D01G6	1
		F. VR.	
1-26-016	16	RK1241210 20KAx2 L=15mm NEW	2
		Jack	
1-43-012	17	B217 2RCA JACK BD, GOLD-PLATE	2
		P. Switch	
1-27-150	18	EXE13E(Q)13	2
		Screws	
1-35-307	19	TORX T10 TTB-BIN 3x10 TIN	8
1-35-308	20	TTB-PH 3x10 TIN	2
1-35-305	21	MSB 3x6 TIN	8
1-35-381	22	MSP 3x20 TIN	4
		Parts List for Package	
	1	QD200 SET	1
	2	SHIPPING CARTON	1
	3	INNER BOX 2034 P1	1
	4	INNER PAD 2034 P2	1
	5	INNER BOX 2034 P2	1
	6	MANUAL	1
	6A	WARRANTY CARD	1
1-50-021	7	15 FT PINKWIRE + FUSE 30A	1
		3 FT BLACKWIRE	1

IC's, Transistors, and Measurements





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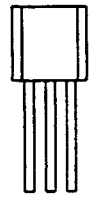

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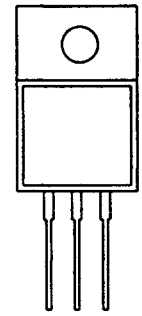
MPS-A56
9014C
9015C



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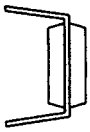

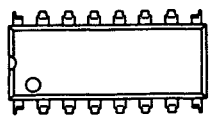

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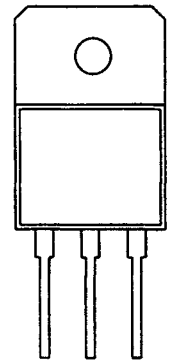


TIP141
TIP146

QD200
TYPICAL AT IC PINS

MEASUREMENT REQUIRED
MEASUREMENT METER: DIGITAL MULTI METER
POWER SOURCE: DC +14.4V
INPUT: NO SIGNAL INPUT

PIN NO. / IC NO.	1	2	3	4	5	6	7	8
IC1, IC6	0V	0V	0V	-15V	0V	0V	0V	+15V
IC2, IC7	0V	0V	0V	-15V	0V	0V	0V	+15V
IC3, IC8	0V	0V	0V	-15V	0V	0V	0V	+15V

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC4, IC5 IC9, IC10	30V	30V	21.5V	0V	0V	-26.8V	-1.6V	1.1V	-30V	-30V	-0.8V	0.8V		

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC11	0V	2.5V	0.05V	0V	1.5V	3.5V	0V	11.2V	4.8V	4.8V	11.2V	13.5V	5V	5V	3.7V	2.5V

TYPICAL AT TRANSISTOR PINS

TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO	C	B	E
Q1, Q5 Q9, Q13	-1.6V	-1V	1.1V
Q2, Q6 Q10, Q14	0V	0.8V	30V
Q3, Q7 Q11, Q15	0V	-0.8V	-30V
Q4, Q8 Q12, Q16	0V	0V	28V

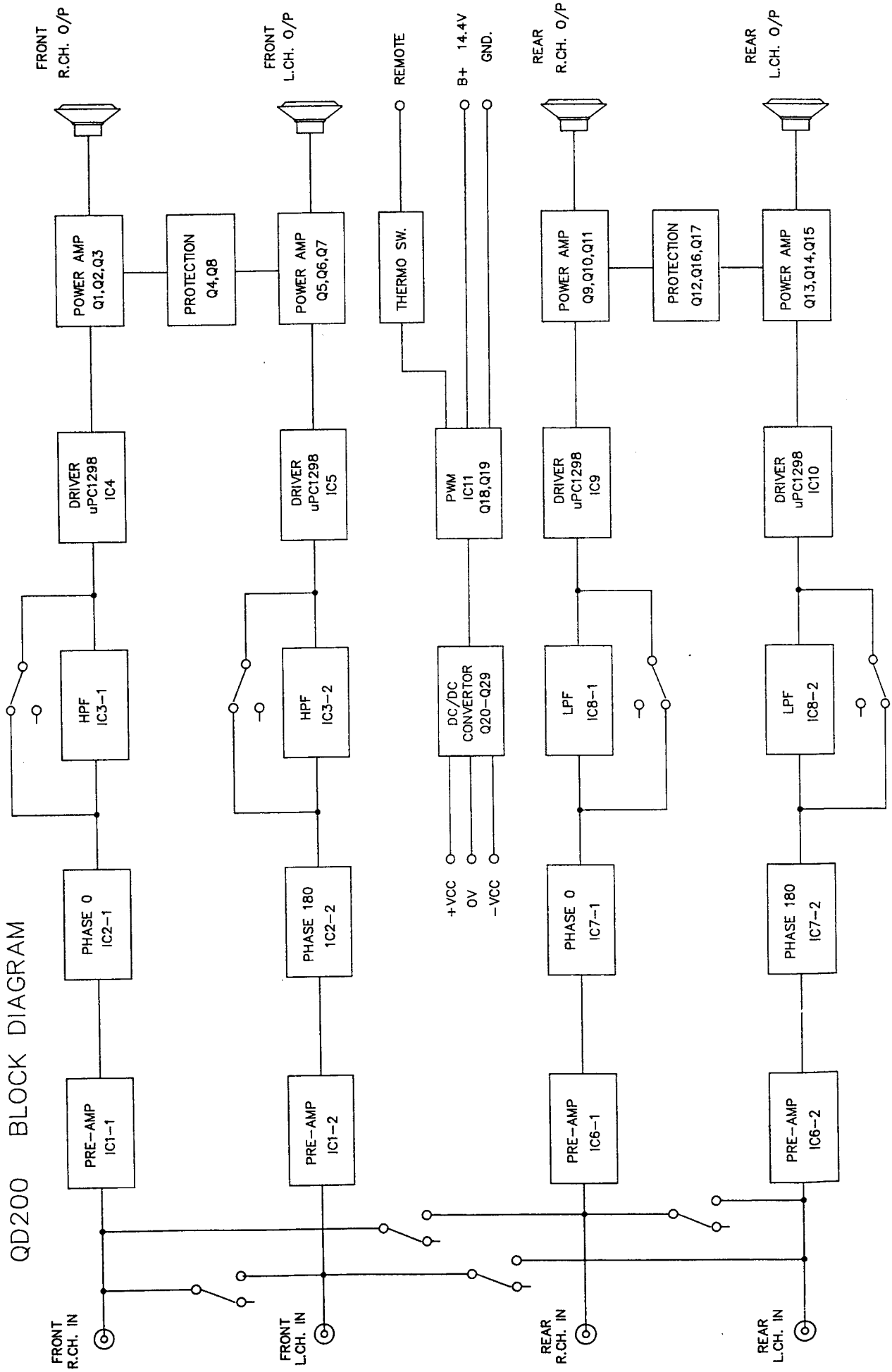
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	E	B	C
Q17	30V	30V	0.05V
Q18	13.6V	13.6V	0.06V
Q19	0V	0.06V	13.6V
Q20, Q24	4.5V	4.8V	0V

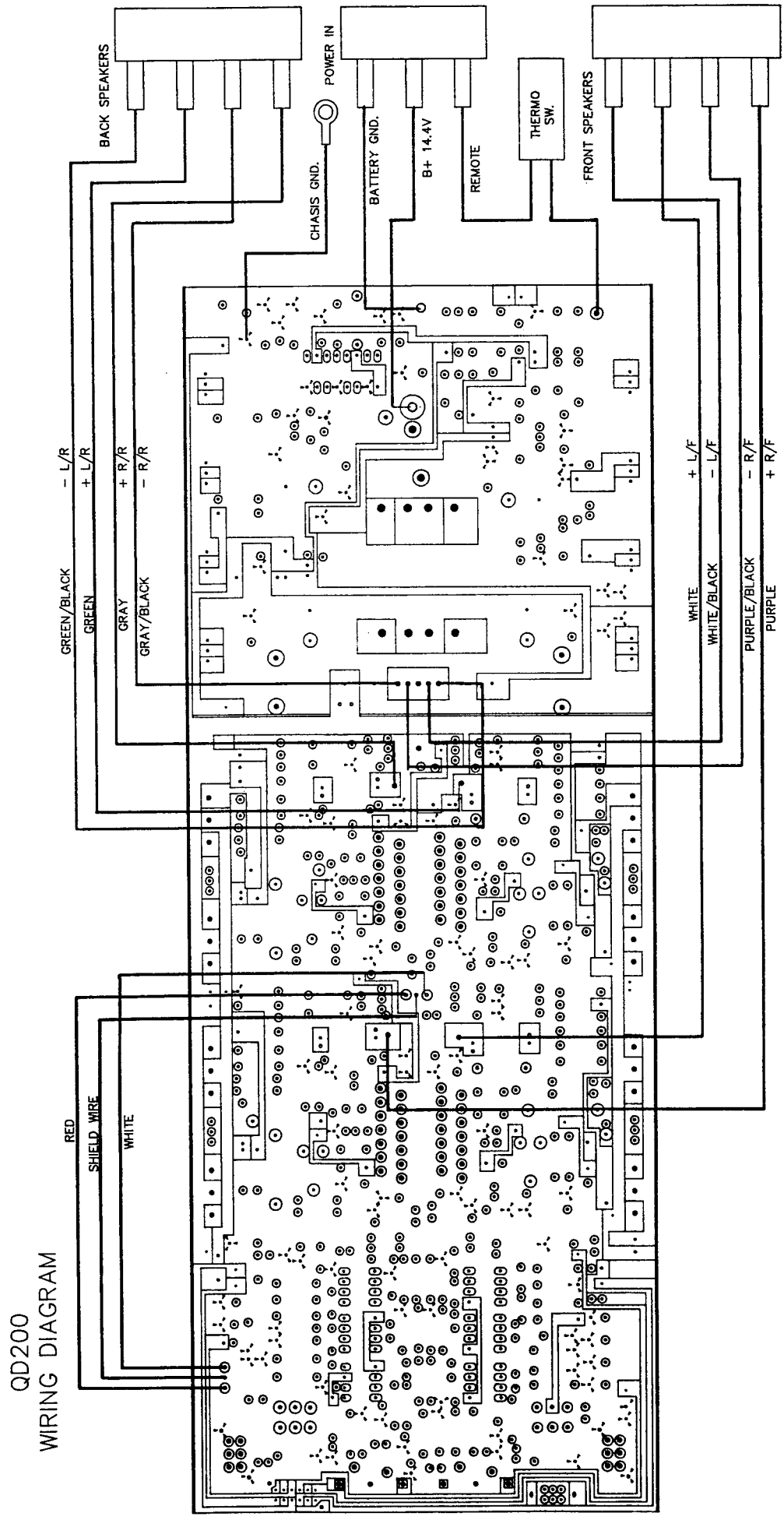
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	E	B	C
Q21, Q22 Q23	0V	4.5V	14.4V
Q25, Q26 Q27	0V	4.5V	14.4V

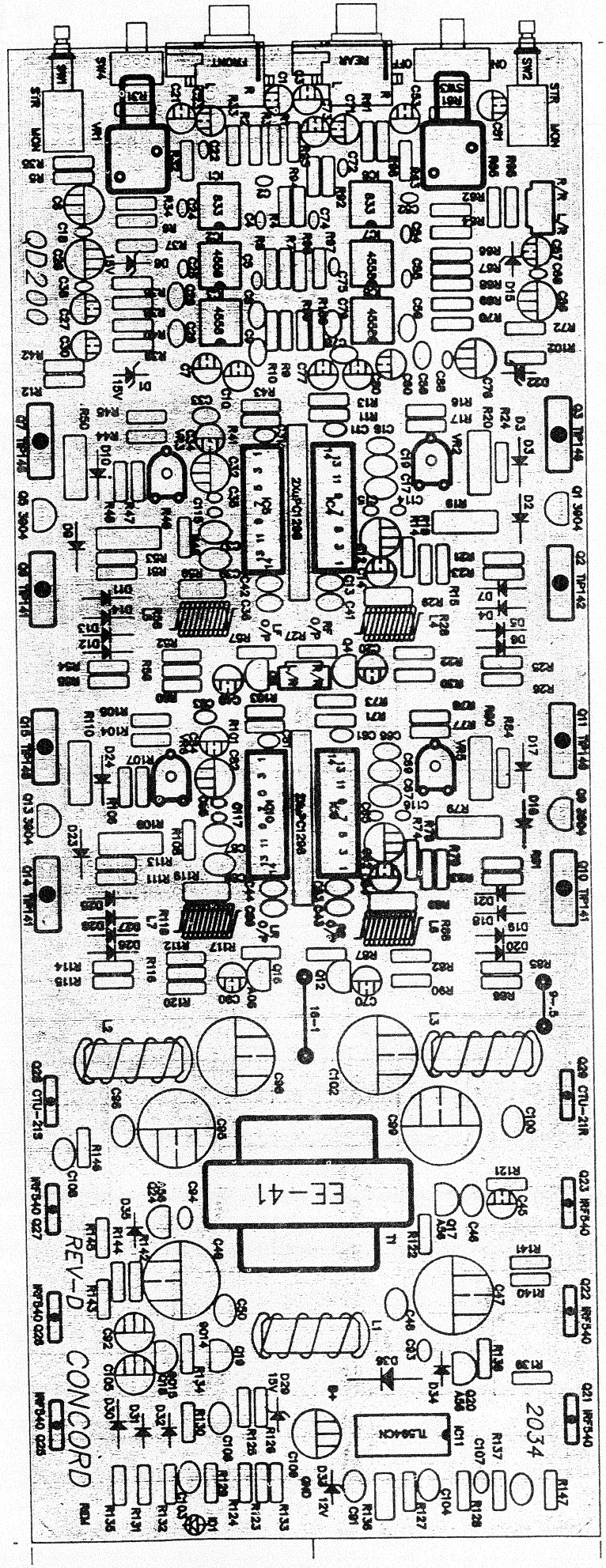
QD-200 Block Diagram



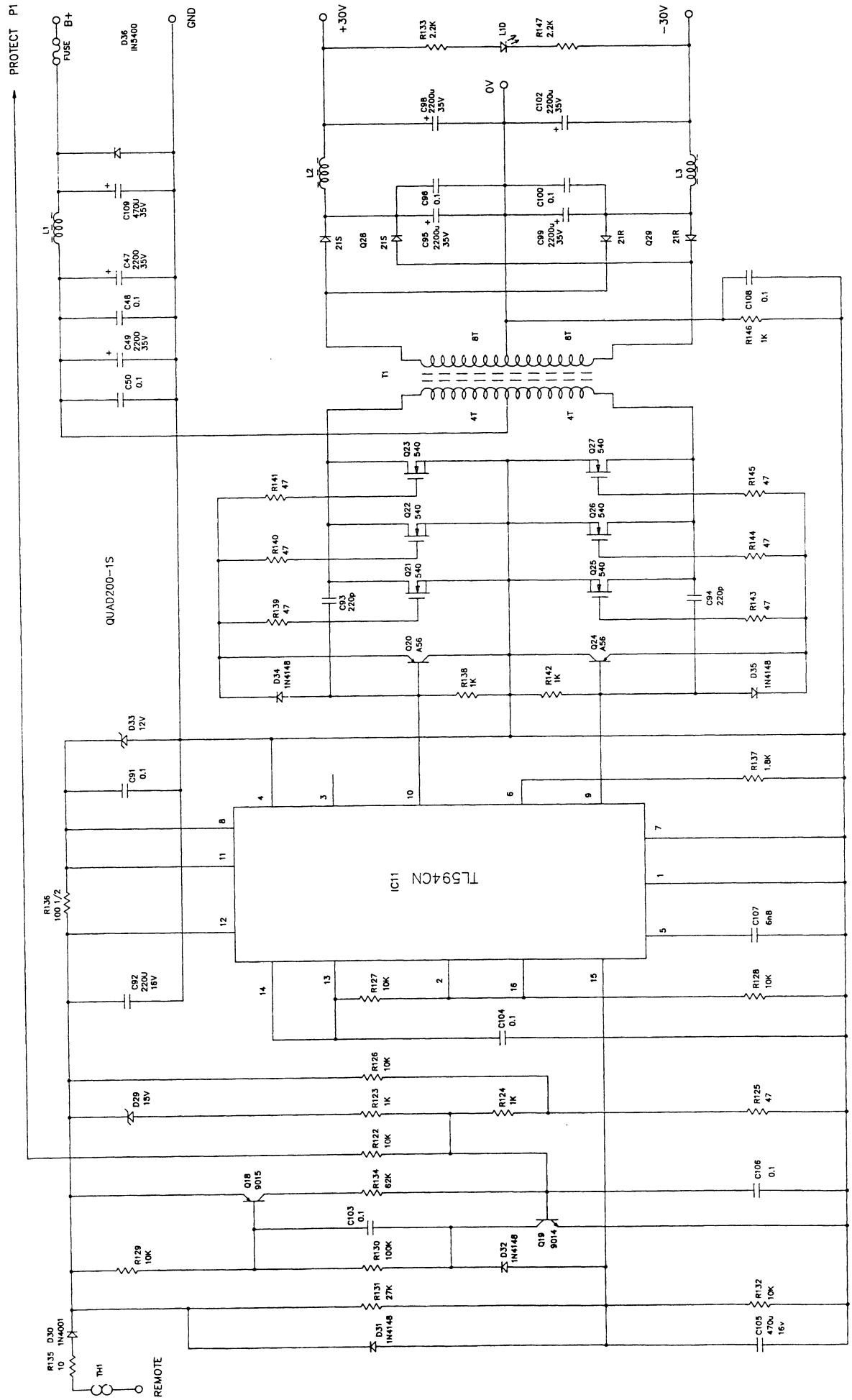
QD-200 Wiring Diagram



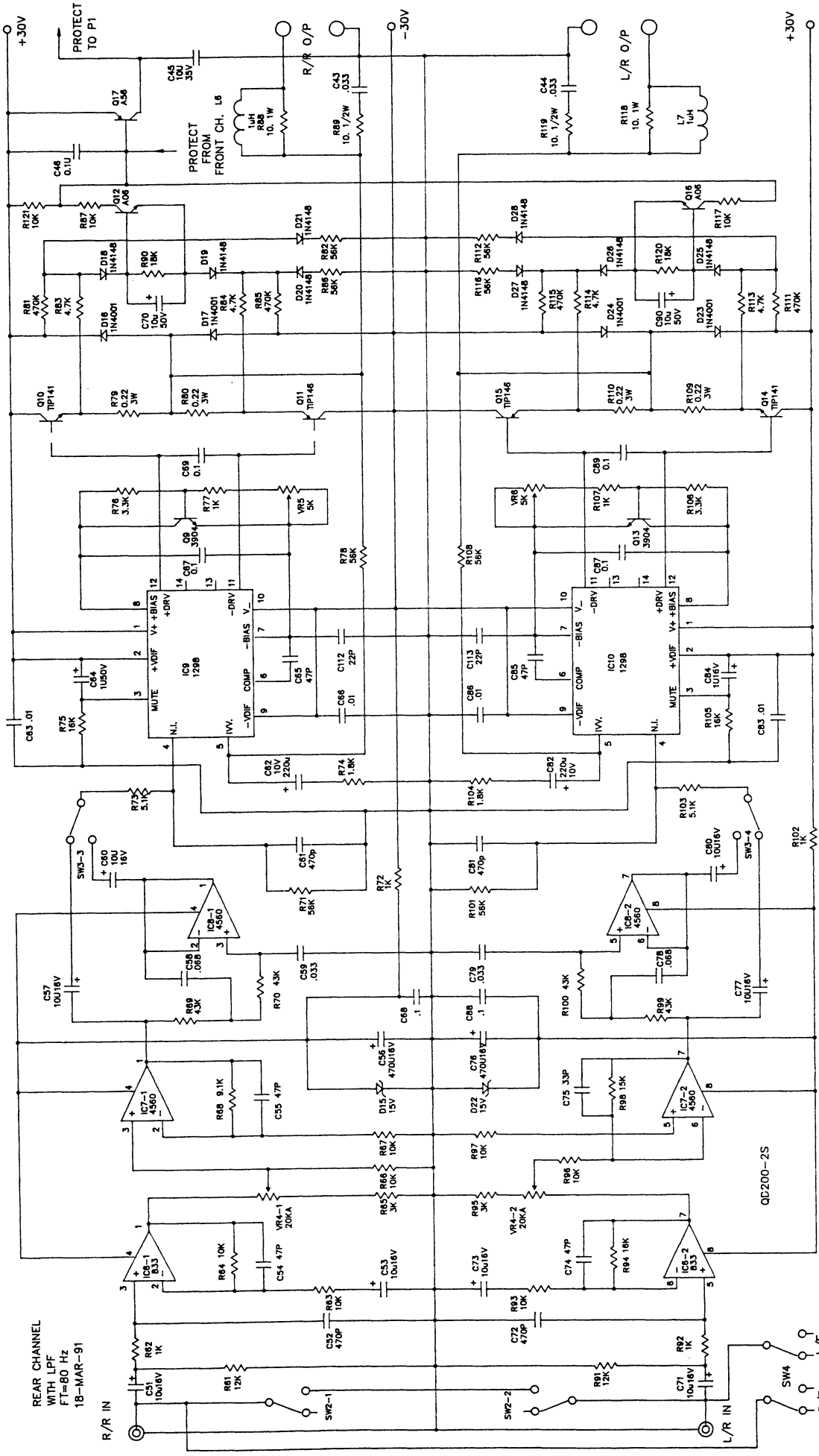
QD-200 Printed Circuit Board



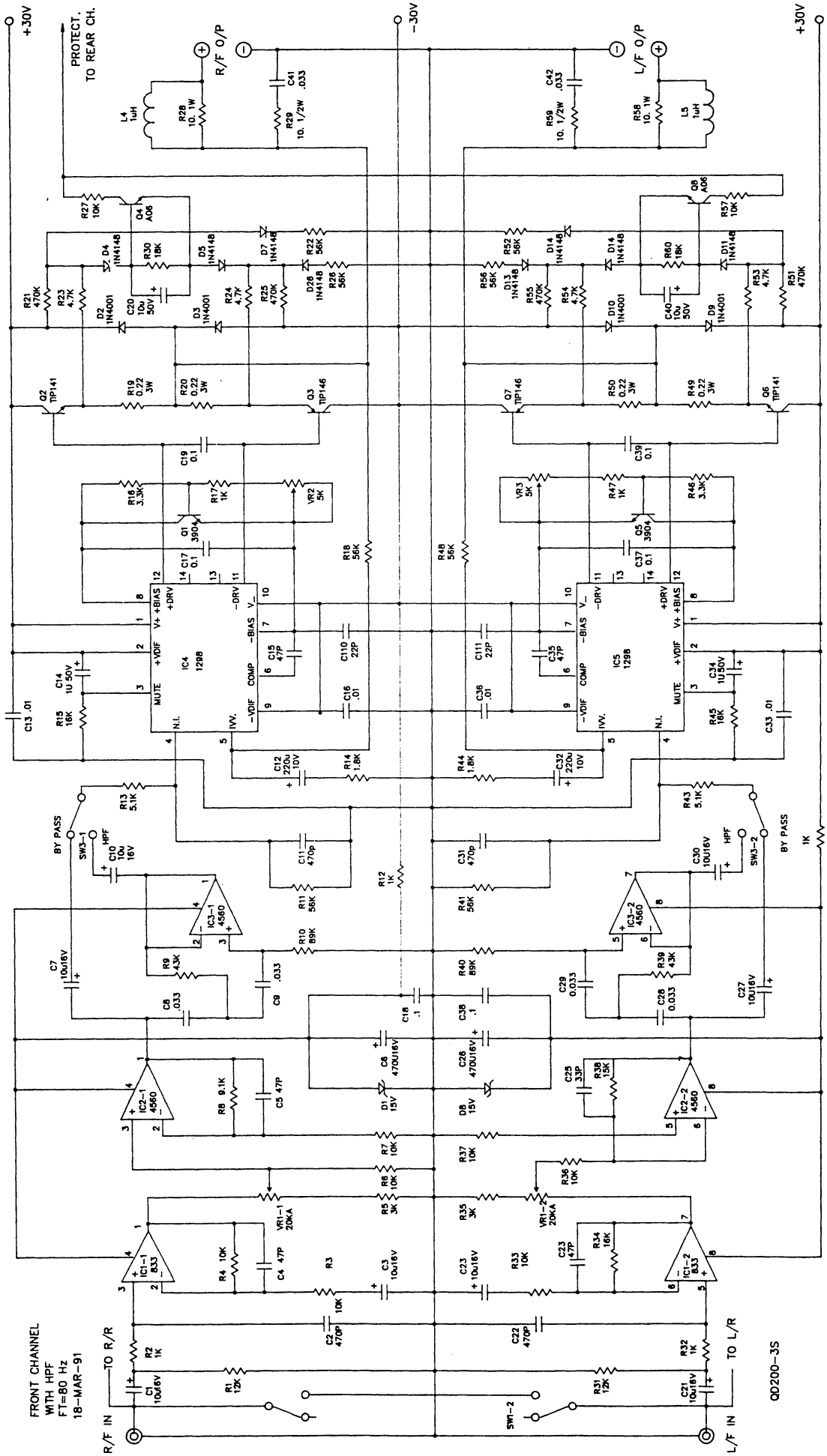
QD-200 Schematics



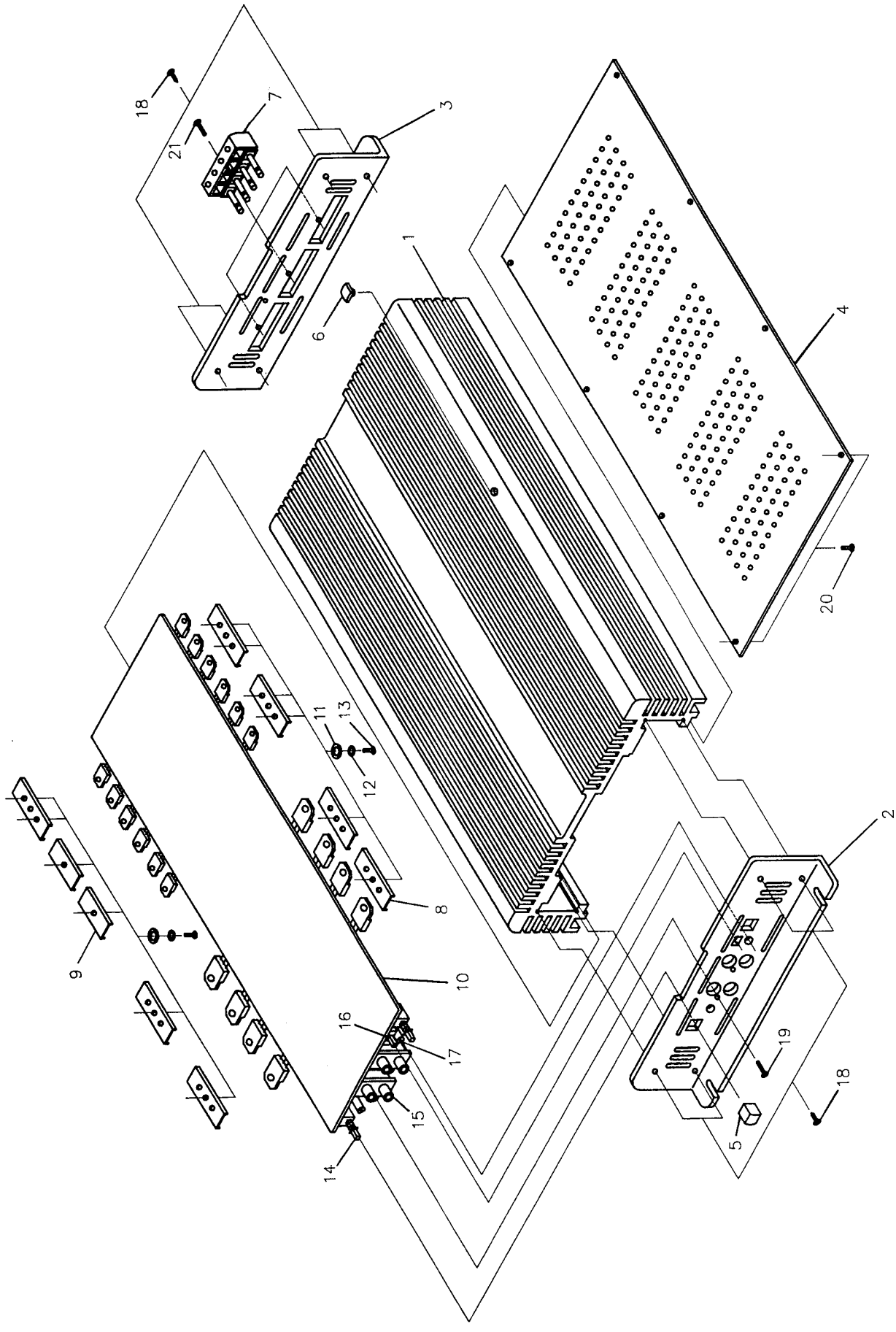
QD-200 Schematics



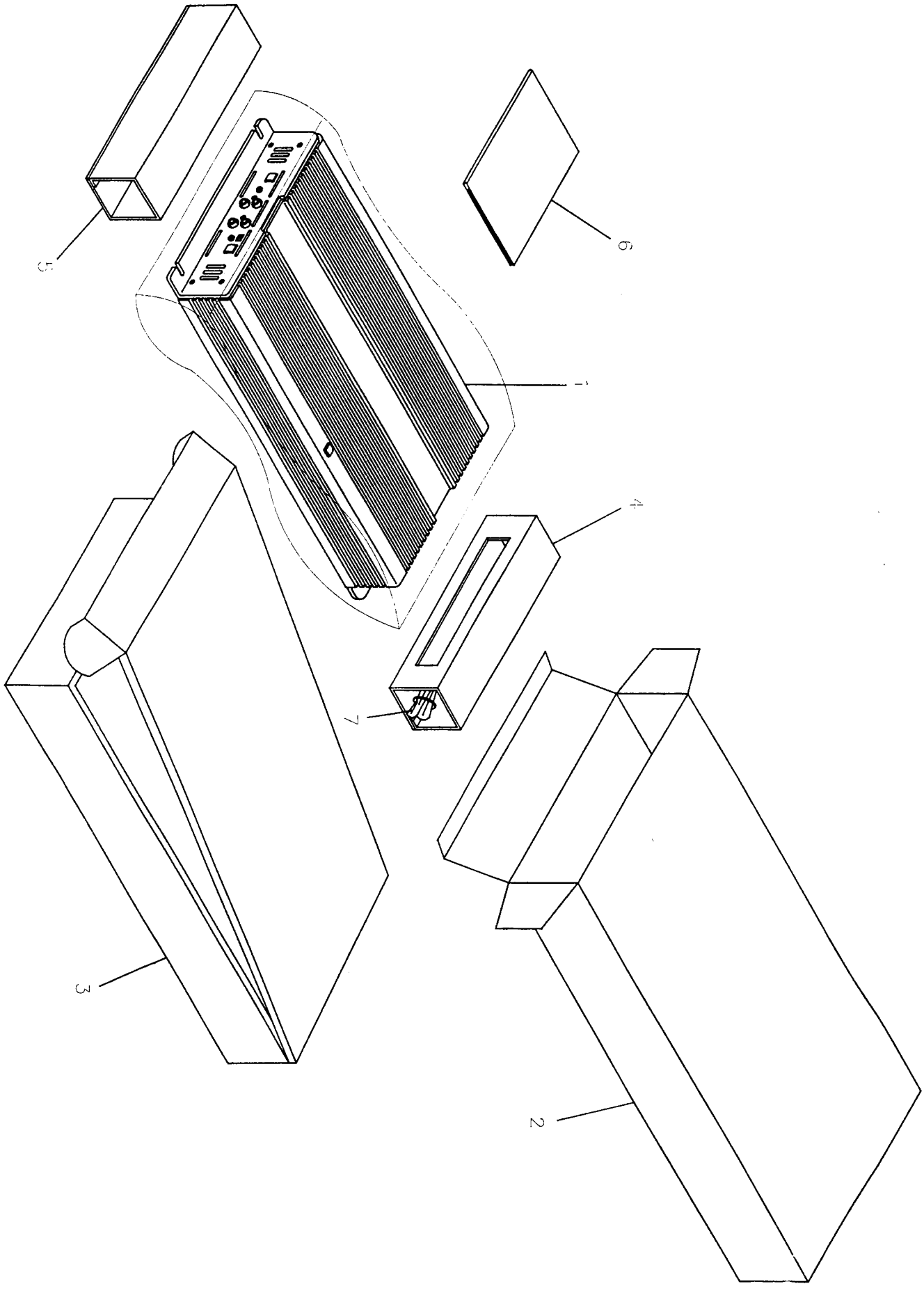
QD-200 Schematics



QD-400 Exploded View



QD-400 Package Exploded View



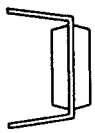
QD-400 Parts List

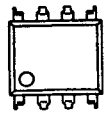
Part #	Reference #	Description	Quantity
		Resistors	
1-18-147	R139, R140, R145, R146, R143, R148, R149, R125, R142	1/4W ±5% PS 47Ω	9
1-18-310	R2, R12, R17, R32, R42, R47, R62, R72, R77, R92, R102, R123, R124, R138, R141, R144, R146, R147, R150	1/4W ±5% PS 1KΩ	19
1-18-318	R14, R44, R74, R104	1/4W ±5% PS 1.8KΩ	4
1-18-324	R137	1/4W ±5% PS 2.4KΩ	1
1-18-330	R5, R16, R35, R46, R65, R95	1/4W ±5% PS 3KΩ	6
1-18-333	R76, R106, R133, R153	1/4W ±5% PS 3.3KΩ	4
1-18-347	R23, R24, R53, R54, R83, R84, R113, R114	1/4W ±5% PS 4.7KΩ	8
1-18-351	R13, R43, R73, R103, R30, R60, R90, R120	1/4W ±5% PS 5.1KΩ	8
1-18-391	R4, R64	1/4W ±5% PS 9.1KΩ	2
1-18-410	R3, R6, R7, R27, R33, R36, R37, R57, R63, R66, R67, R87, R93, R96, R97, R117, R122, R126, R151, R127, R128, R129, R132, R121	1/4W ±5% PS 10KΩ	24
1-18-412	R1, R31, R61, R91	1/4W ±5% PS 12KΩ	4
1-18-413	R8, R68	1/4W ±5% PS 13KΩ	2
1-18-416	R15, R34, R38, R45, R75, R94, R105	1/4W ±5% PS 16KΩ	7
1-18-418	R34, R94	1/4W ±5% PS 18KΩ	2
1-18-427	R131	1/4W ±5% PS 27KΩ	1
1-18-443	R69, R99	1/4W ±5% PS 43KΩ	2
1-18-456	R11, R18, R22, R26, R41, R48, R52, R56, R71, R78, R82, R86, R101, R108, R112, R116	1/4W ±5% PS 56KΩ	16
1-18-462	R134	1/4W ±5% PS 62KΩ	1
1-18-488	R10, R88	1/4W ±5% PS 88KΩ	2
1-18-510	R130, R152	1/4W ±5% PS 100KΩ	2
1-18-547	R21, R25, R51, R55, R81, R85, R111, R115	1/4W ±5% PS 470KΩ	8
1-18-443	R100, R70, R9, R39	1/4W ±5% METAL FILM 43KΩ	4
1-19-110	R29, R59, R89, R119, R135	1/2W ±5% PS 10Ω	5
1-19-210	R136	1/2W ±5% PS 100Ω	1
1-20-110	R28, R58, R88, R118	1W ±5% METAL OXIDE 10Ω	4
1-23-022	R19, R20, R49, R50, R79, R80	5W ±5% WIRE WOUND 0.22Ω	8
		Ceramic Capacitors	
1-16-022	C114, C115, C116, C117	50V ±10% 22pF	4
1-16-033	C25, C75	50V ±10% 33pF	2
1-16-047	C4, C5, C24, C54, C55, C74, C15, C35, C65, C85	50V ±10% 47pF	10
1-16-122	C109, C110, C11, C112	50V ±10% 220pF	4
1-16-147	C2, C11, C22, C31, C52, C61, C72, C81	50V ±10% 470pF	8
		Mylar Capacitors	
1-10-201	C13, C16, C33, C36, C63, C66, C83, C86	100V ±10% 0.01µF	8
1-10-333	C8, C9, C28, C29, C41, C42, C43, C44, C59, C79	100V ±10% 0.033µF	10
1-10-368	C58, C78	100V ±10% 0.068µF	2
1-10-456	C107	100V ±10% 0.0056µF	1
		Electrolytic Capacitors	
1-12-010	C14, C34, C64, C84	50V ±20% 5x11 1µF	4
1-12-110	C1, C3, C7, C10, C20, C21, C23, C27, C30, C40, C45, C51, C53, C57, C60, C70, C71, C73, C77, C80, C90	16V ±20% 5x11 10µF	21
1-12-220	C12, C32, C62, C82, C92	16V ±20% 8x12 220µF	5
1-12-247	C6, C26, C56, C76, C105	16V ±20% 8x14 470µF	5
1-12-247	C113	25V ±20% 10x16 470µF 105c	1
1-12-522	C47, C48, C49, C50	35V ±20% 16x30 2200µF 105c	4
1-12-522	C93, C94, C95, C98, C99, C100	40V ±20% 16x30 2200µF 85c	6

Part #	Reference #	Description	Quantity
		Mono	
1-14-091	C17, C18, C19, C37, C38, C39, C46, C67, C68, C69, C87, C88, C89, C91, C96, C97, C101, C102, C103, C104, C106, C108	MONO50V ±20% 0.1μF (EC04WD0104M)	22
		Coil	
1-04-010	L4, L5, L6, L7	SPRING COIL 1mmx13Ts 6.35mm	4
		IC	
1-09-022	IC1, IC6	LM833	2
1-09-421	IC2, IC3, IC7, IC8	BA4560	4
1-09-561	IC11	GL494 / TL594	1
1-09-021	IC4, IC5, IC9, IC10	UPC1298	4
		Transistors	
1-07-004	Q19	9014C	1
1-07-005	Q18	9015C	1
1-07-103	Q1, Q5, Q9, Q13	2N3904	4
1-07-107	Q4, Q8, Q12, Q16	MPS A06	4
1-07-109	Q17, Q20, Q26, Q23, Q29	MPS A56	5
		P. Transistors	
1-08-150	Q37	BD137/BD139	1
		Zener	
1-06-005	D1, D8, D15, D22, D29	1/2W ±5% 15V	5
1-06-107	D33	1/2W ±5% 12V	1
		Diodes	
1-05-009	D2, D3, D9, D10, D16, D17, D23, D24, D30	IN4001	9
1-05-006	D38	IN5400	1
1-05-009	D4, D5, D6, D7, D11, D12, D13, D14, D18, D19, D20, D21, D25, D26, D27, D28, D31, D32, D34, D35	IN4148	20
		Coil	
1-01-QDA	L2, L3	D=1mm 12Tsx1 w/ T22FT25	2
1-01-QDB	L1	D=1.6mm 12Tsx2 w/ T22FT25	1
		NK041	
1-01-QDD	T1	P=1.6mm 3Tsx4, s=1.2mm 8Tsx2	2
		Rectifiers	
1-05-007	Q33, Q35	CTU 21R	2
1-05-008	Q32, Q34	CTU 21S	2
		P. Transistors	
1-09-023	Q21, Q22, Q24, Q25, Q27, Q28, Q30, Q31	MTP50N06E	8
1-08-112	Q2, Q6, Q10, Q14	SGS D100	4
1-08-113	Q3, Q7, Q11, Q15	SGS D200	4
		LED	
1-25-150	LD1	MRB31D RED LED	1
		Resistor	
1-26-350	VR2, VR3, VR5, VR6	SEMI-FIXED 5KR MURATA HORI	4
		SI. Switch	
1-27-016	SW4	2P2T SK-22D03G6	1
1-27-405	TH1	THERMO SW. 17AM203A5-4	1
		DC Fan	
1-03-201	FAN	AD0612HS-C70 60x60x20 12VDC	1
		Panel	
3-06-004	1	2018-4 HEAT SINK L=381mm	1
3-06-001	2	2018-1 FRONT PANEL	1
3-06-002	3	2018-2 REAR PANEL	
3-06-003	4	2018-3 BOTTOM COVER	1
3-06-008	5	2018-8 SW. KNOB	2
3-06-009	6	2018-9 BADGE	1

Part #	Reference #	Description	Quantity
		T'nal	
3-06-005	7	2018-5 T'NAL HOLDER 4P w/SP	2
3-06-007	7A	2018-5W T'NAL HOLDER 4P w/DC	1
3-06-006	7A	2018-6 C.W.BKT.41.5x7.8.1mm	3
		Brackets	
3-42-010	8	1841-5 TRA.BKT. 3 HOLES	7
3-42-011	9	1841-5B TRA.BKT. 1 HOLE	2
PCB			
3-57-001	10	QD400 MAIN BD.380x116x1.6FR4	1
		S&W	
1-37-130	11	M3 FLAT WASHER ZNC	16
1-37-230	12	M3 SPRING WASHER ZNC	16
1-35-314	13	3x14 TTB-PH ZNC	12
		Push Switch	
1-27-106	14	2P2T SPPJ22A68A PUSH SWITCH	2
		Jack	
1-43-012	15	B217 2RCA JACK BD. GOLD-PLATE	2
		Sl. Switch	
1-27-017	16	4P2T SK-42D01G6	1
		R. VR	
1-26-016	17	RK1241210 20KAx2 L=15mm NEW	2
		S&W	
1-35-307	18	TORX T10 TTB-BIN 3x10 TIN	8
1-35-308	19	TTB-PH 3x10 TIN	2
1-35-305	20	MSB 3x6 TIN	8
1-35-381	21	MSP 3x20 TIN	3
		Panel	
	1	QD400 SET	1
	2	SHIPPING CARTON	1
	3	INNER BOX 2018 P1	1
	4	INNER PAD 2018 P2	1
	5	INNER BOX 2018 P2	1
	6	MANUAL	1
	6A	WARRANTY CARD	1
		Wire	
1-50-021	7	15 FT PINKWIRE + FUSE 30A	2
	7A	3 FT BLACKWIRE	1

IC's, Transistors, and Measurements





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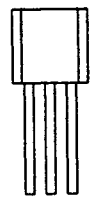

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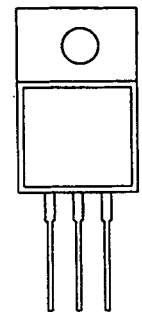
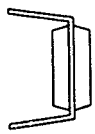
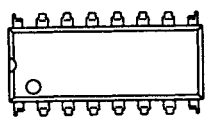
9015C



CTU-21S
CTU-21R
IRF540





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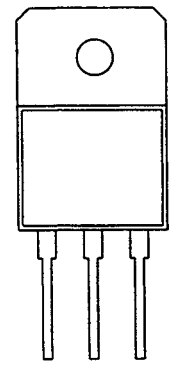
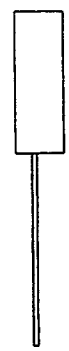
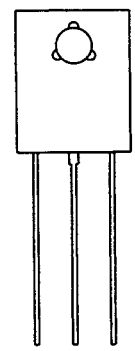


TIP141
TIP146

QD400
TYPICAL AT IC PINS

MEASUREMENT REQUIRED
MEASUREMENT METER: DIGITAL MULTI METER
POWER SOURCE: DC +14.4V
INPUT: NO SIGNAL INPUT





BD137
BD139

PIN NO. / IC NO.	1	2	3	4	5	6	7	8
IC1, IC6	0V	0V	0V	-15V	0V	0V	0V	+15V
IC2, IC7	0V	0V	0V	-15V	0V	0V	0V	+15V
IC3, IC8	0V	0V	0V	-15V	0V	0V	0V	+15V

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
IC4, IC5 IC9, IC10	30V	30V	21.5V	0V	0V	-26.8V	-1.6V	1.1V	-30V	-30V	-0.8V	0.8V		

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC11	0V	2.5V	0.05V	0V	1.5V	3.5V	0V	10.5V	4.4V	4.4V	10.5V	13.5V	5V	5V	3.7V	2.5V

TYPICAL AT TRANSISTOR PINS

TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	C	B	E
Q1, Q5 Q9, C13	-1.6V	-1.2V	1.2V
Q2, Q6 Q10, Q14	0V	1V	40V
Q3, Q7 Q11, Q15	0V	-1V	-40V
Q4, Q8 Q12, Q16	0V	0V	38V

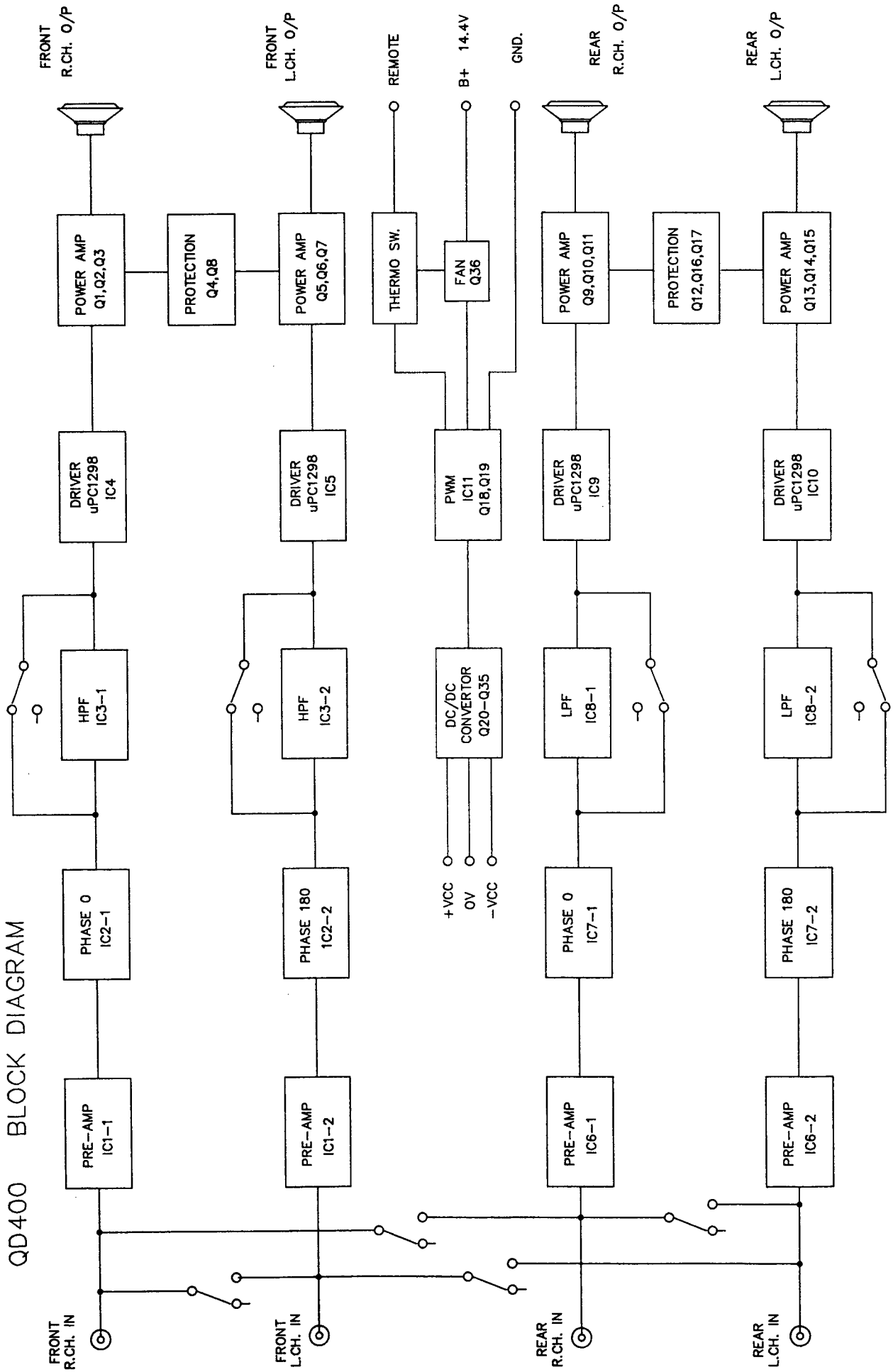
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	E	B	C
Q17	40V	40V	0.05V
Q18	13.6V	13.6V	0.06V
Q19	0V	0.06V	13.6V
Q20, Q23 Q26, Q29	4.3V	4.4V	0V

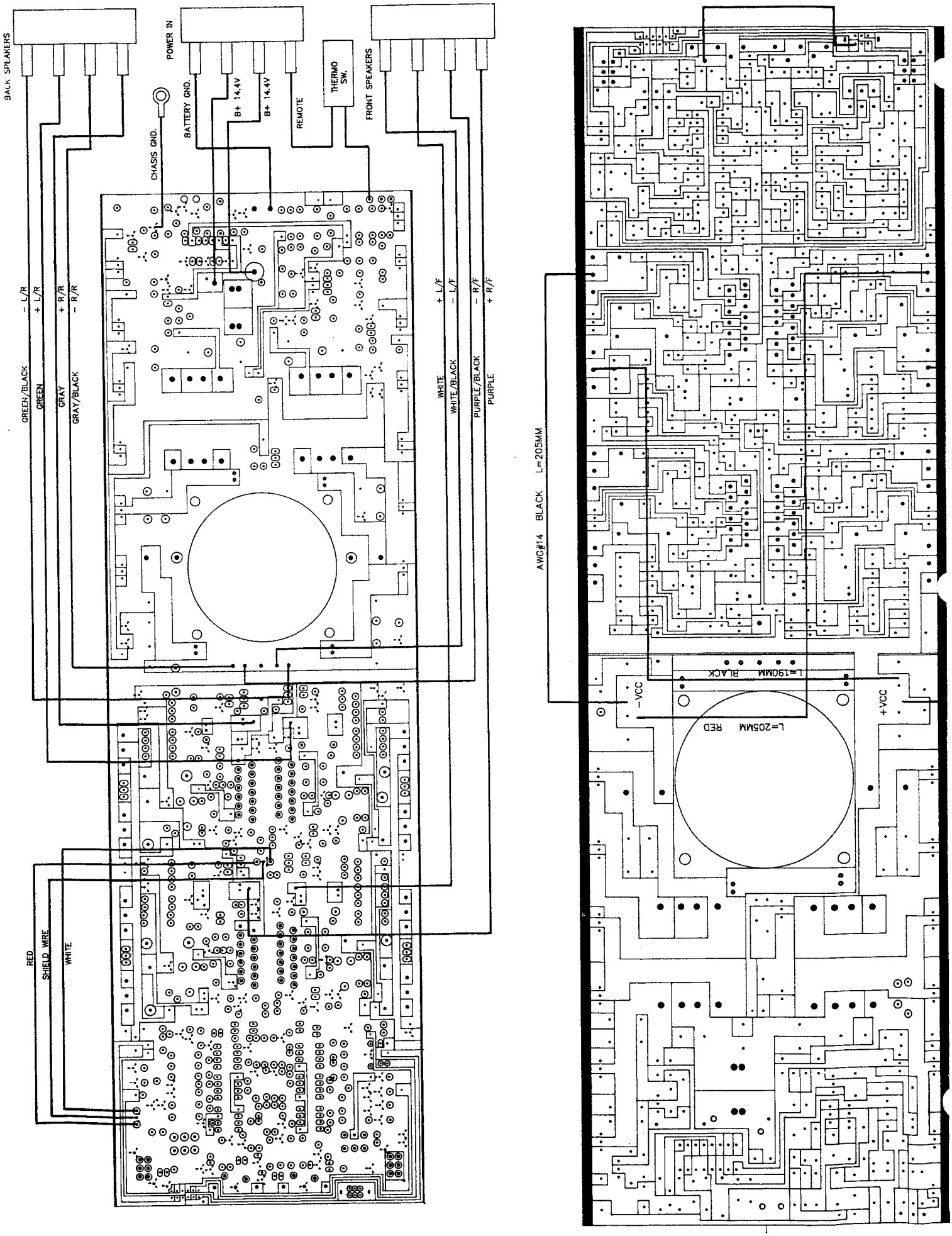
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	E	B	C
Q21, Q22 Q24, Q25	0V	4.3V	14.4V
Q27, Q28 Q30, Q31	0V	4.3V	14.4V

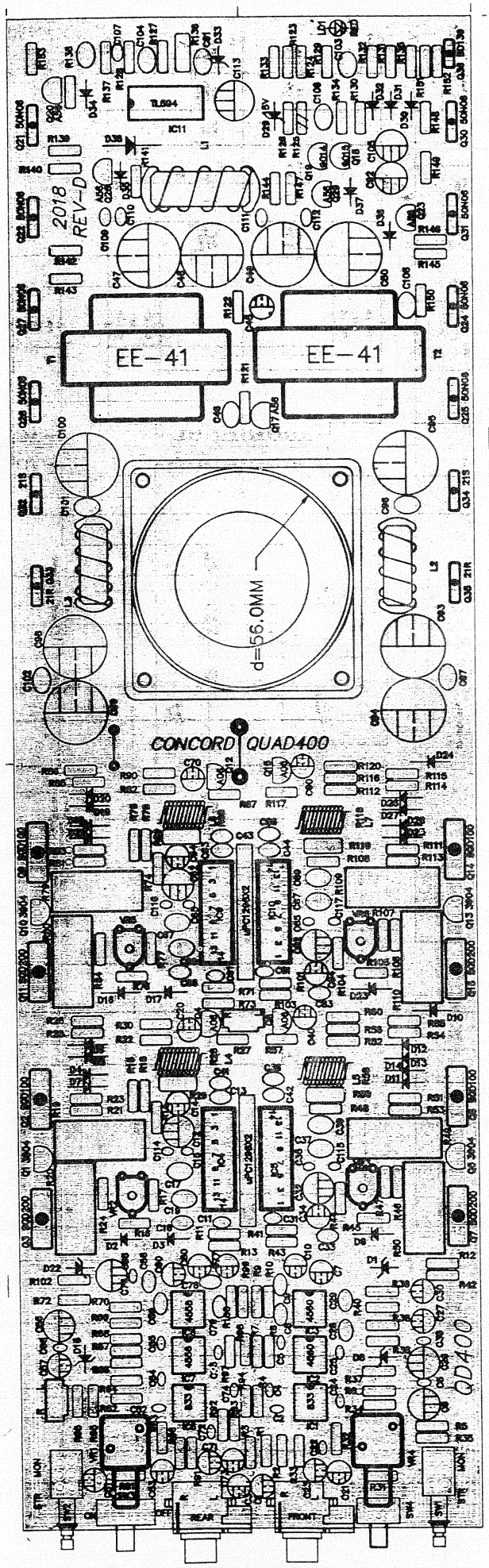
QD-400 Block Diagram



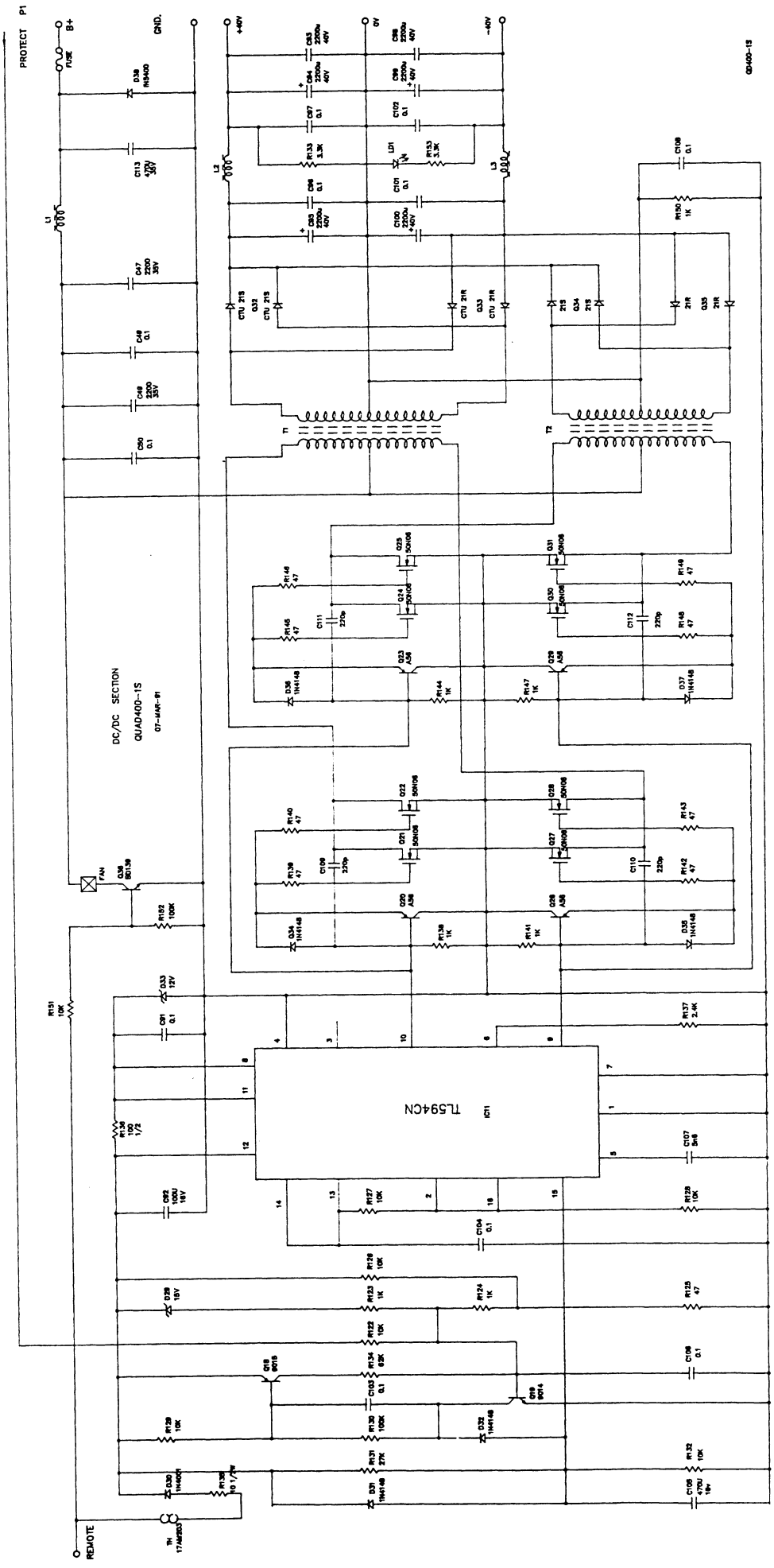
QD-400 Wiring Diagram



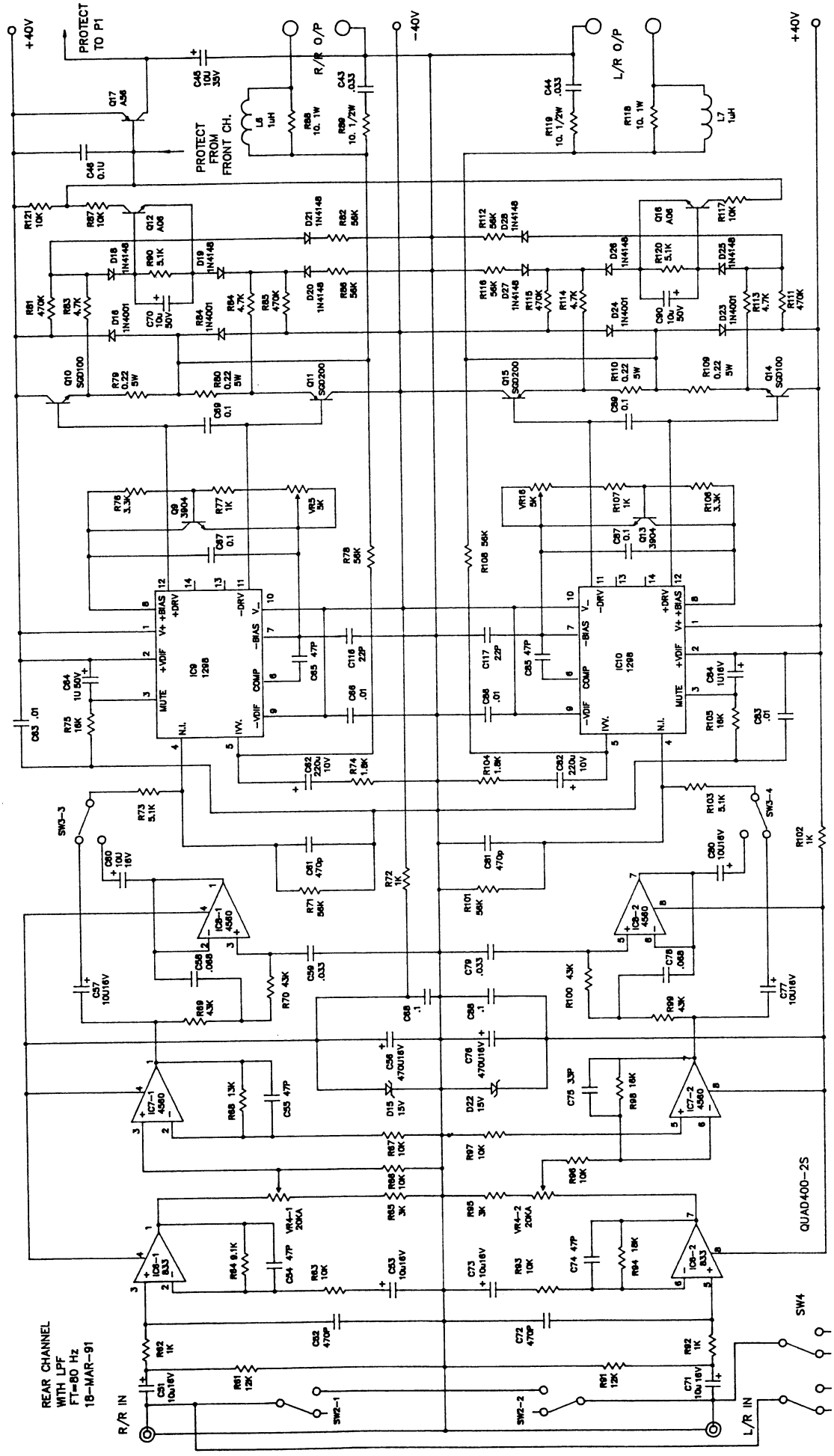
QD-400 Printed Circuit Board



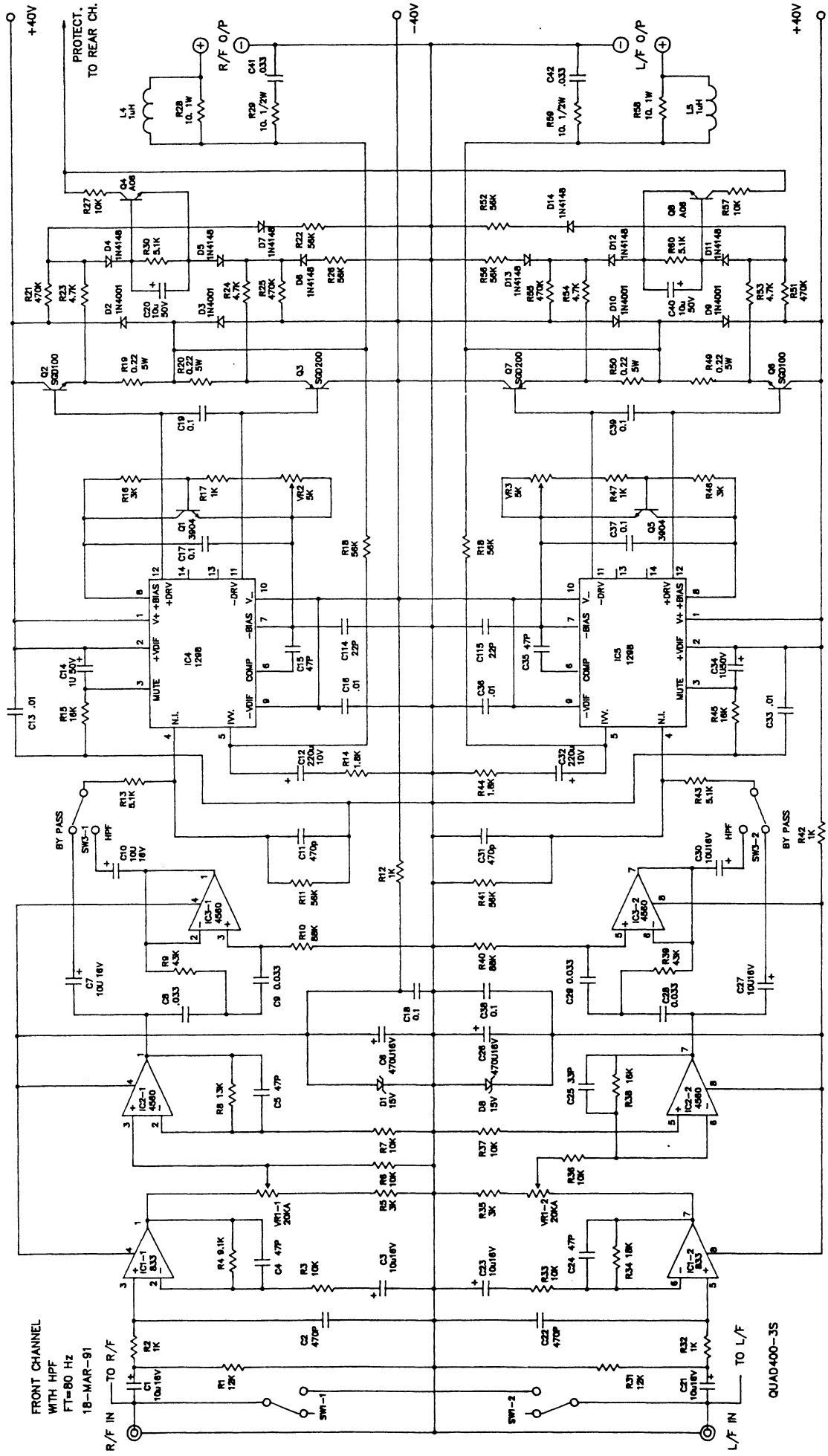
QD-400 Schematics



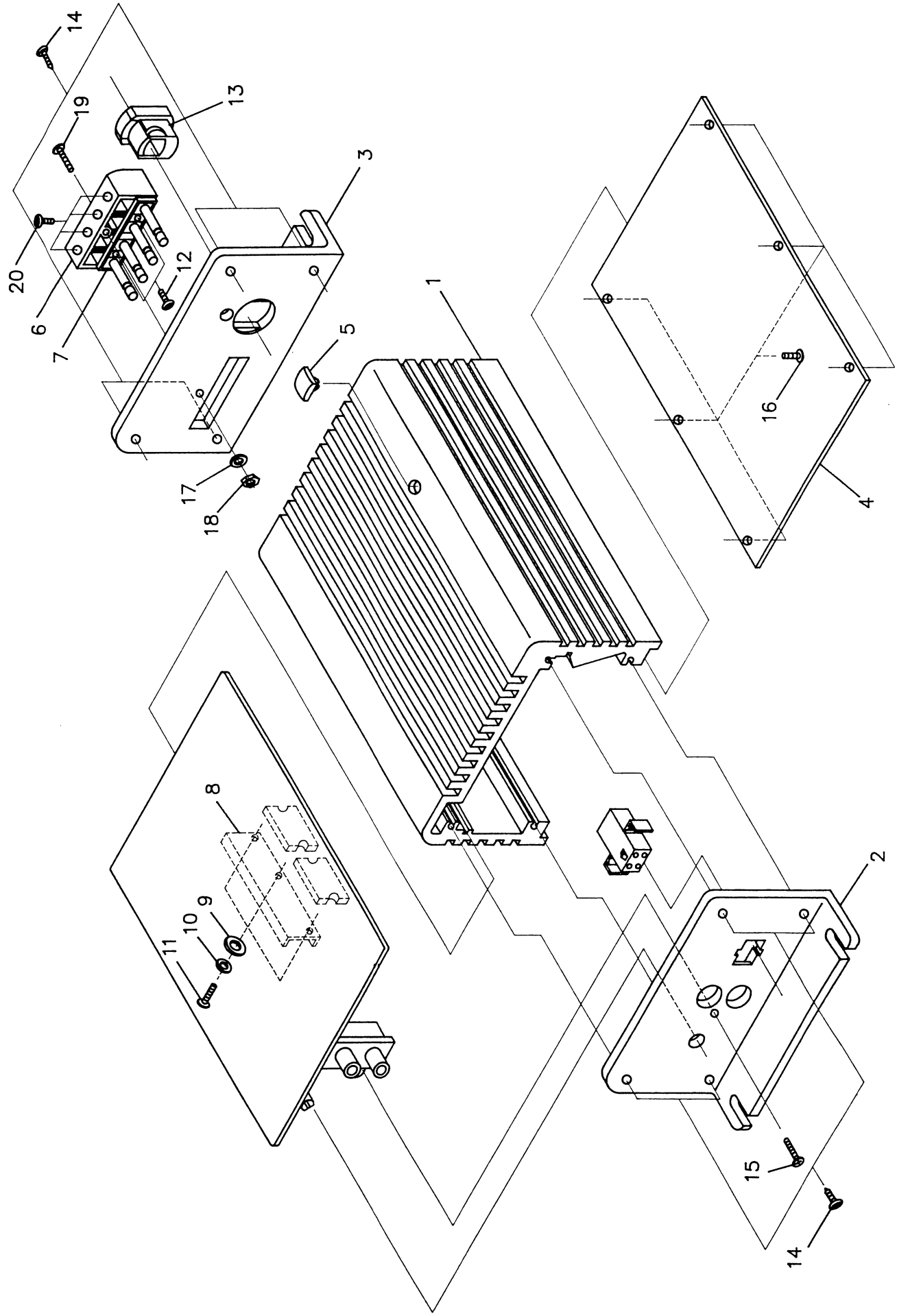
QD-400 Schematics



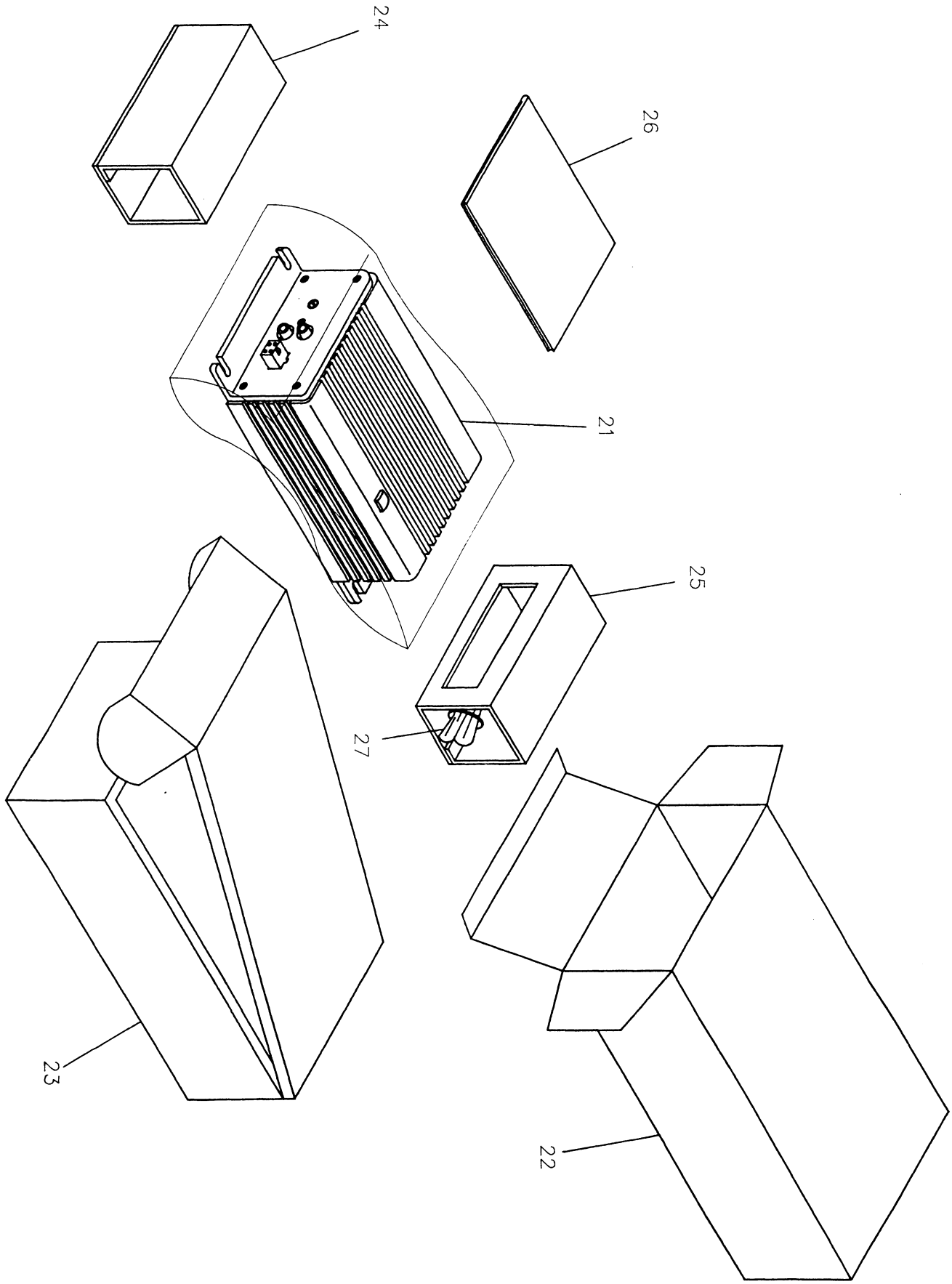
QD-400 Schematics



ST-50 Exploded View



ST-50 Package Exploded View

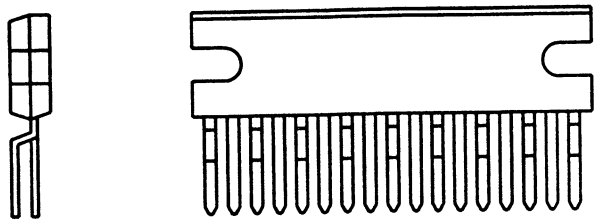


ST-50 Parts List

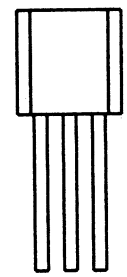
Part #	Reference #	Description	Quantity
		Resistors	
1-18-010	R13, R16, R29, R32	1/4W ±5% PS 1Ω	4
1-18-075	R12, R15, R28, R31	1/4W ±5% PS 75Ω	4
1-18-310	R34, R36	1/4W ±5% PS 1KΩ	2
1-18-322	R37, R38, R39	1/4W ±5% PS 2.2KΩ	3
1-18-330	R3, R7, R8, R11, R14, R19 R23, R24, R27, R30, R35	1/4W ±5% PS 3KΩ	11
1-18-410	R9, R25	1/4W ±5% PS 10KΩ	2
1-18-427	R40	1/4W ±5% PS 27KΩ	1
1-18-433	R10, R26	1/4W ±5% PS 33KΩ	2
1-18-468	R4, R5, R6, R20, R21, R22, R33	1/4W ±5% PS 68KΩ	7
1-18-518	R2, R18	1/4W ±5% PS 180KΩ	2
1-20-210	R1, R17	1W ±5% METAL OXIDE 100Ω	2
		Mylar Capacitors	
1-10-301	C3, C14, C17, C28	100V ±10% 0.001μF	4
1-10-347	C9, C12, C23, C26, C32	100V ±10% 0.047μF	5
		Electrolytic Capacitors	
1-12-010	C2, C6, C16, C20	50V ±20% 5x11 1μF	4
1-12-110	C1, C4, C15, C18, C29, C31	16V ±20% 5x11 10μF	6
1-12-147	C7, C21	16V ±20% 5x11 47μF	2
1-12-210	C8, C11, C22, C25	10V ±20% 6x11 100μF	4
1-12-220	C10, C13, C24, C27, C30	10V ±20% 6x11 220μF	5
1-12-522	C33, C34	16V ±20% 13x21 2200μF	2
		Ceramic Capacitors	
1-16-110	C5, C19	50V ±10% 100pF B TYPE	2
		IC	
1-09-009	IC1, IC2	TA8225H	2
		Transistors	
1-07-004	TR1, TR2, TR3	9014C	3
		Diodes	
1-05-001	D2, D3, D4	IN4001	3
		Zener	
1-06-001	D1	1/2W ±5% 5.1V	1
		LED	
1-25-150	LD1	MRB31D RED LED	1
		Coil	
1-01-101	T3	E1-19 24Ts	1
1-01-104	T1, T2	E1-19 10K:10K	2
		Variable Resistors	
1-26-104	VR1A, VR1B	RK14K12200A02A 20KAx2	1
		RCA	
1-43-012	RCA1	B217A 2RCA JACK (R/W) GOLD P.	1
		Fuse	
1-29-104A	PC1	FUSE SET	1
		Con.	
3-24-006	CP1, CP2, CP3, CP4	1807-6 BRASS WIRE CONNECTOR	4
1-50-041A	CP5	2004-04R 4POLE FEMALE CON. SET	1
		Wire	
1-50-026	GC1	30/0.193x3mm PVC J/W BLACK WIRE 610mm (5+15)	1
1-51-036	WS1, WS2	AWG#28 SHIELD WIRE 2 PIN BROWN 70mm (20+20) A/B	2
		PCB	
3-60-009	MAIN PCB	ST50-1 MAIN P.C.B. REV. C	1
		Mechanical Parts List	
3-60-004	1	2031-4 TOP COVER HEAT SINK	1
3-60-001	2	2031-1 FRONT PANEL	1
3-60-002	3	2031-2 REAR PANEL	1
3-60-003	4	2031-3 BOTTOM COVER	1

Part #	Reference #	Description	Quantity
3-06-008	5	2018-9 BADGE PINK	1
3-60-005	6	2031-5 TERMINAL HOLDER	1
3-60-006	7	2031-6 W. C. BKT.	1
3-60-008	8	2031-8 IC BKT.	1
1-37-130	9	M3 FLAT WASHER ZNC	2
1-37-230	10	M3 SPRING WASHER ZNC	3
1-35-314	11	3x14 TTB-PH ZNC	3
1-33-206	12	2x6 PT BZ	2
1-44-470	13	WIRE CLIP CONNECTOR SR-F42	1
1-35-307	14	TORX T10 TTB-BTN 3x10 TIN	8
1-35-308	15	TTB-PH 3x10 TIN	1
1-35-305	16	MSB 3x6 TIN	6
1-37-230	17	M3 SPRING WASHER ZNC	1
1-37-030	18	M3 NUT	1
1-35-381	19	MSP 3x20 TIN	1
3-24-007	20	M3x7 NI BM	4
		Parts List for Package	
	21	STEREO 50 SET	
ST50-1	22	GIFT BOX STEREO-50	1
2031-PI	23	INNER BOX 2031-P1 BIG	1
2031-P2	24, 25	INNER BOX 2031-P2 SMALL	2
1-29-104	25-1	FUSE LAMP 7A	1
1-36-120	25-2	10x5/8 PA BZ	4
1-37-150	25-3	M4 FLAT SPRING BZ	4
1-37-250	25-4	M4 SPRING WASHER BZ	4
ST50-2	26-1	MANUAL OWNER'S	1
ST50-3	26-2	WARRANTY CARD	1
1-50-040	27	2004-04P1 4POLE MALE CON. SET	1

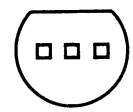
IC's, Transistors, and Measurements



TA8225H



2N3904
MPS-A06
MPS-A56
9014C
9015C



ST-50
TYPICAL AT IC PINS

MEASUREMENT REQUIRED
MEASUREMENT METER: DIGITAL MULTIMETER
POWER SOURCE: DC +14.4V
INPUT: NO SIGNAL INPUT

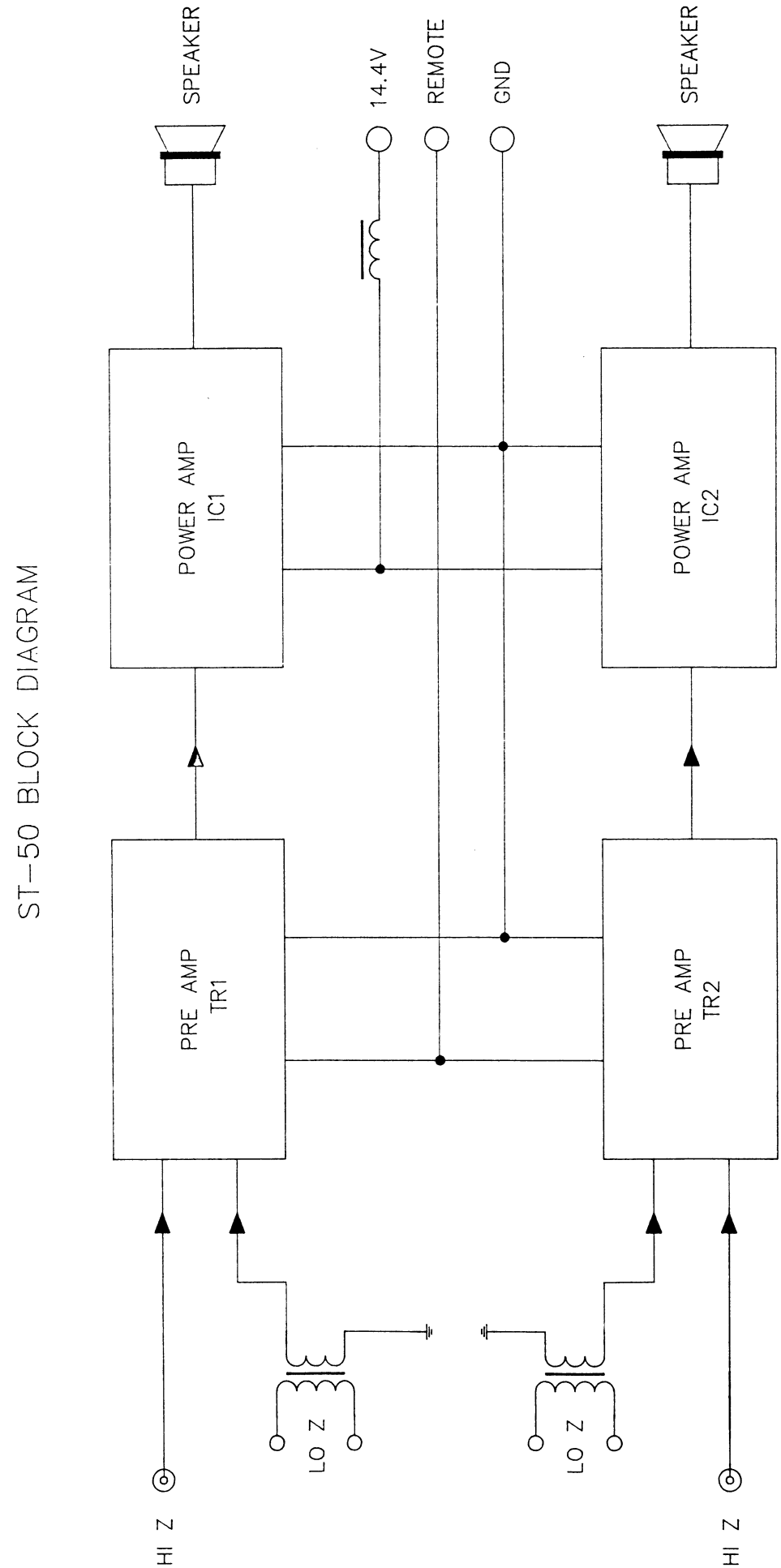
PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1C1, IC2	6.4V	N.C.	1.9V	0V	0V	0V	1.9V	N.C.	7.3V	14.4V	0V	13.4V	0V	0V	13.3V	0V	14.4V

TYPICAL AT TRANSISTOR PINS

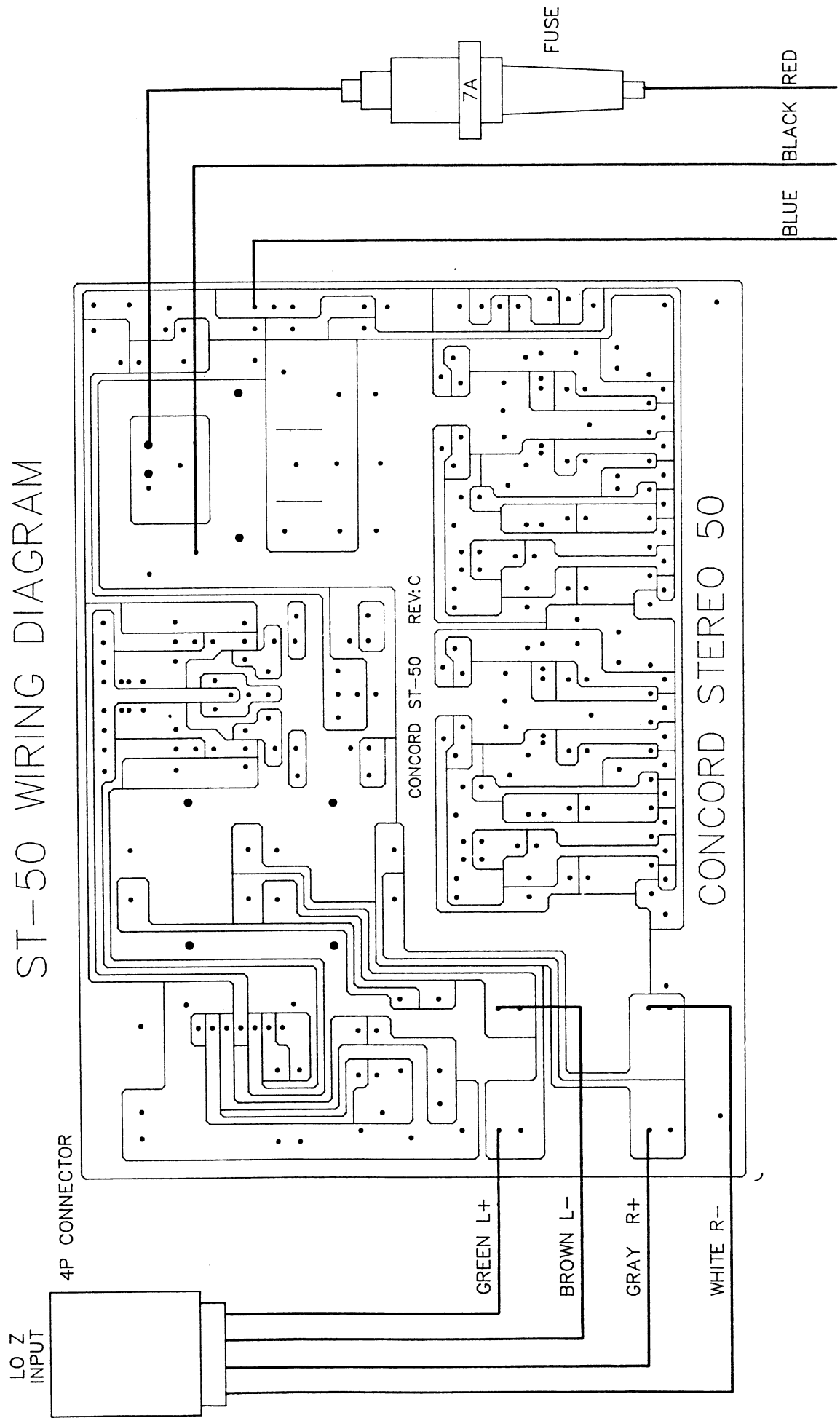
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	C	B	E
TR1	6V	3V	2.4V
TR2	6V	3V	2.4V
TR3	1.7V	2.3V	1.7V

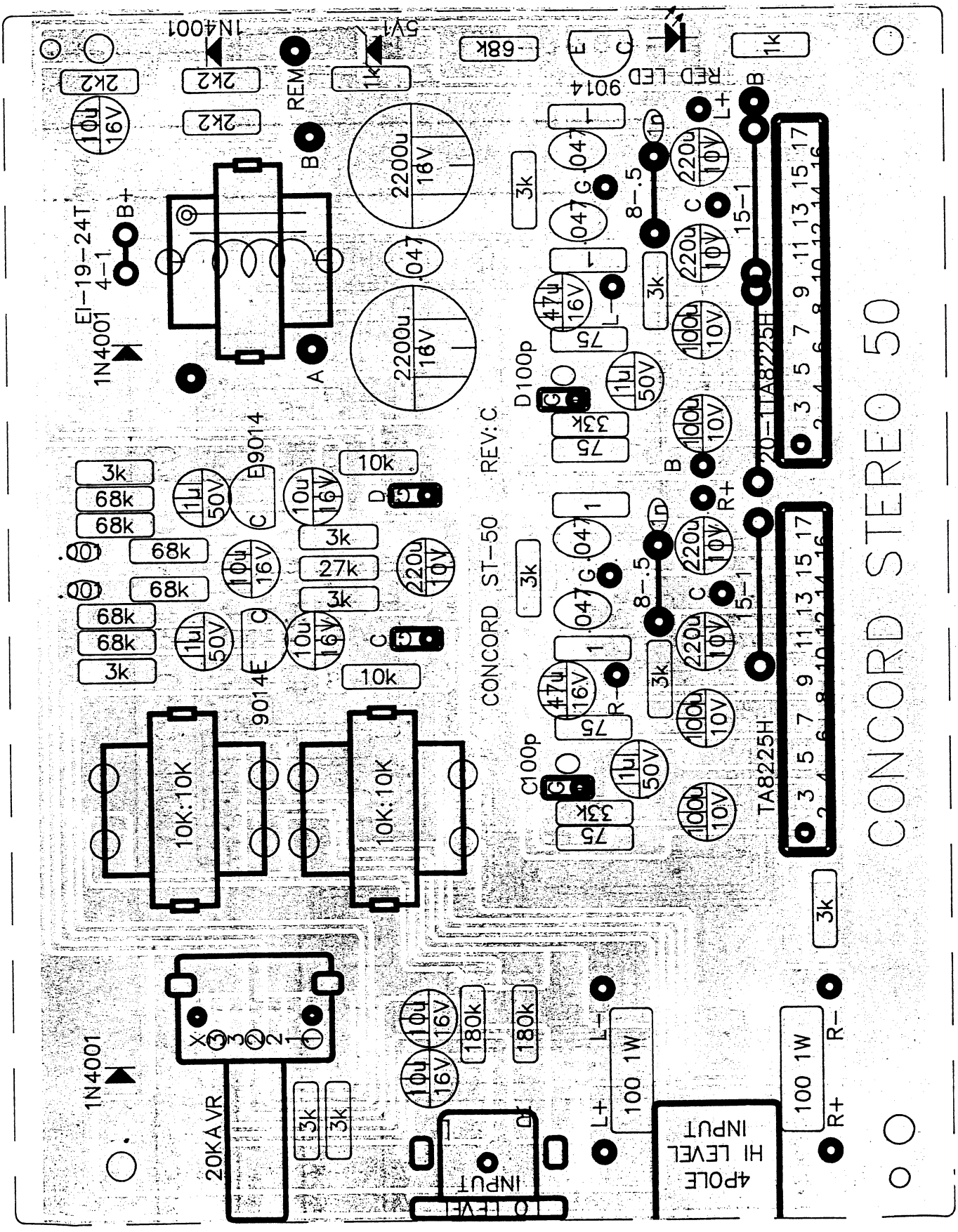
ST-50 Block Diagram



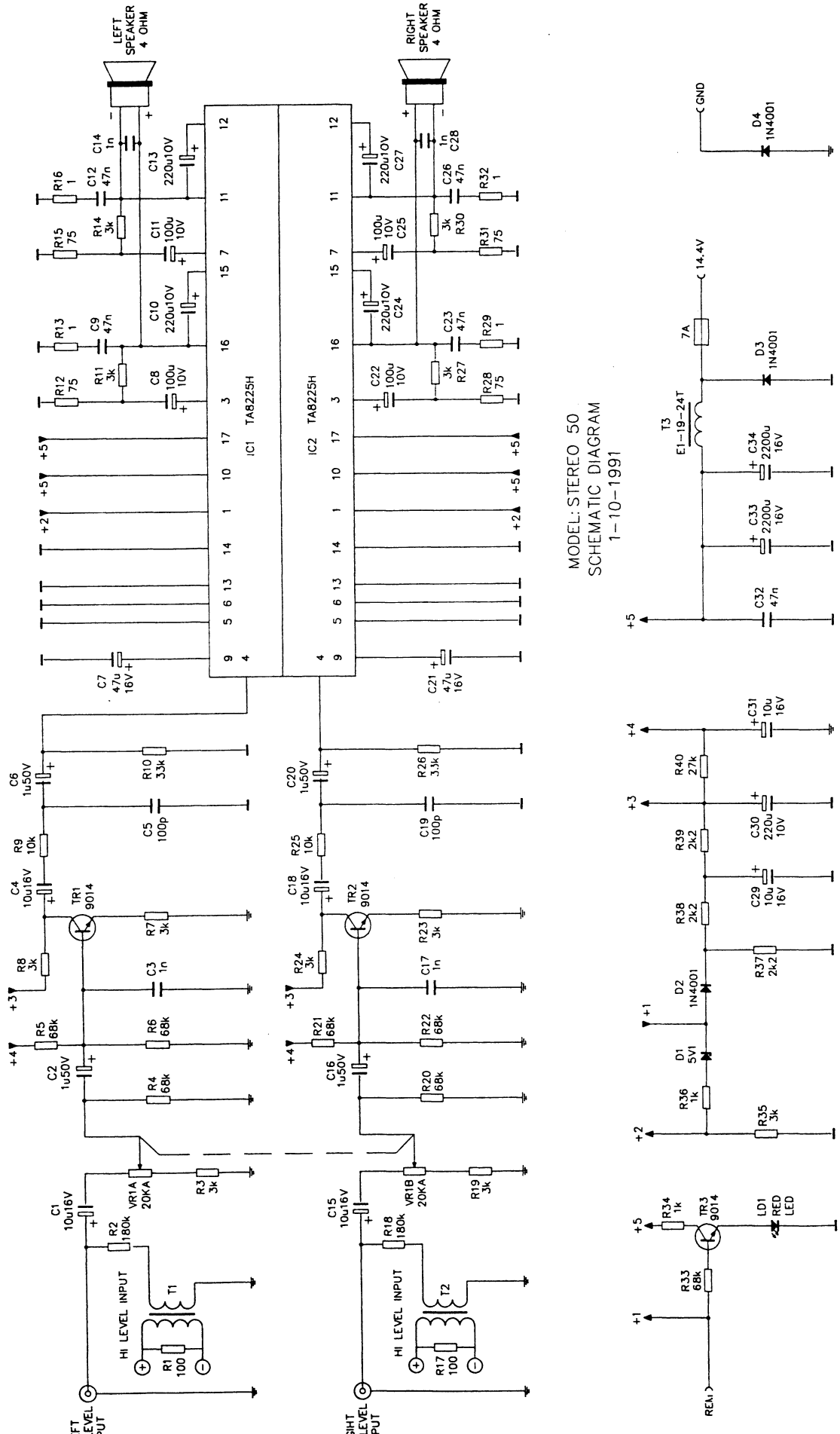
ST-50 Wiring Diagram



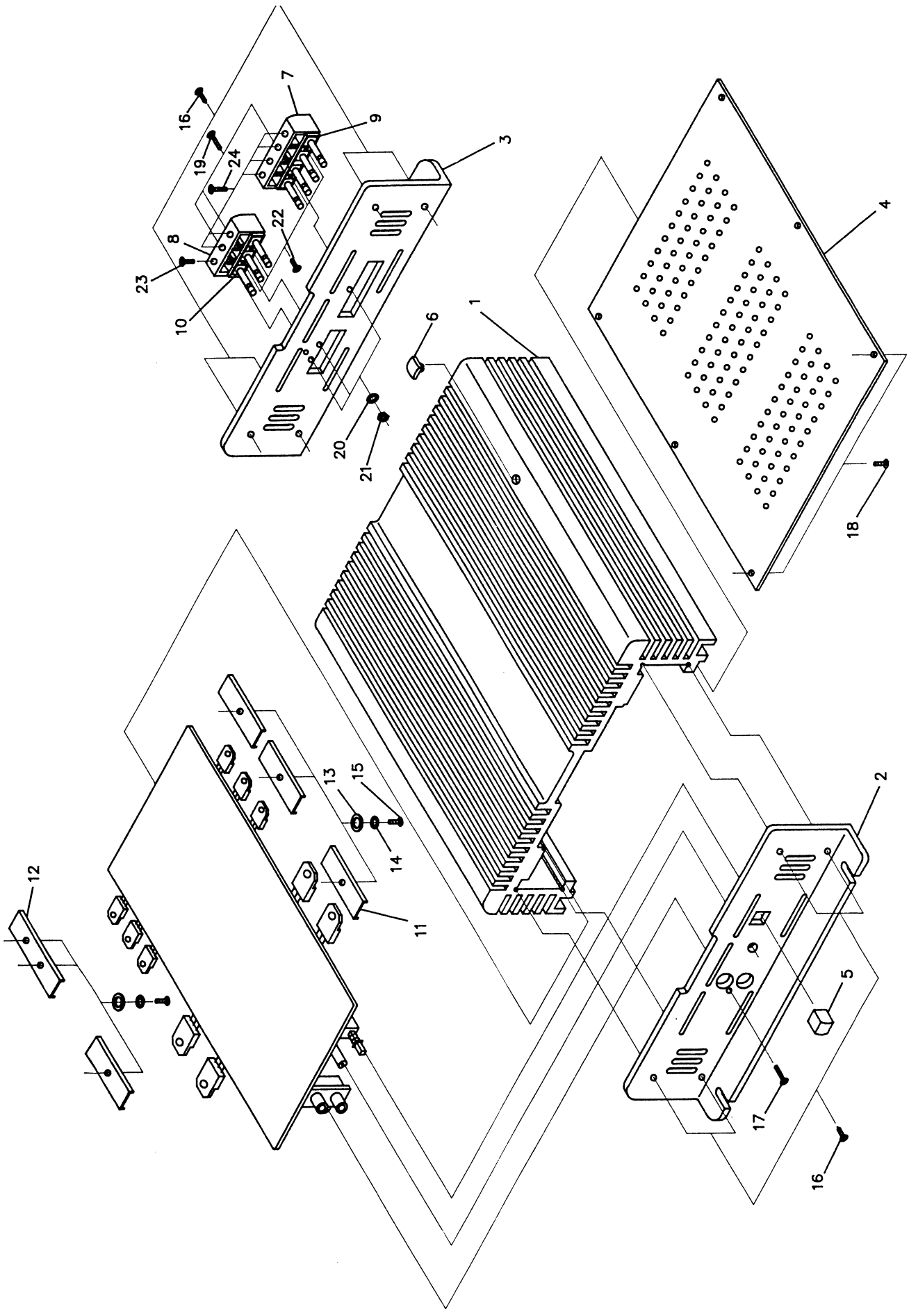
ST-50 Printed Circuit Board



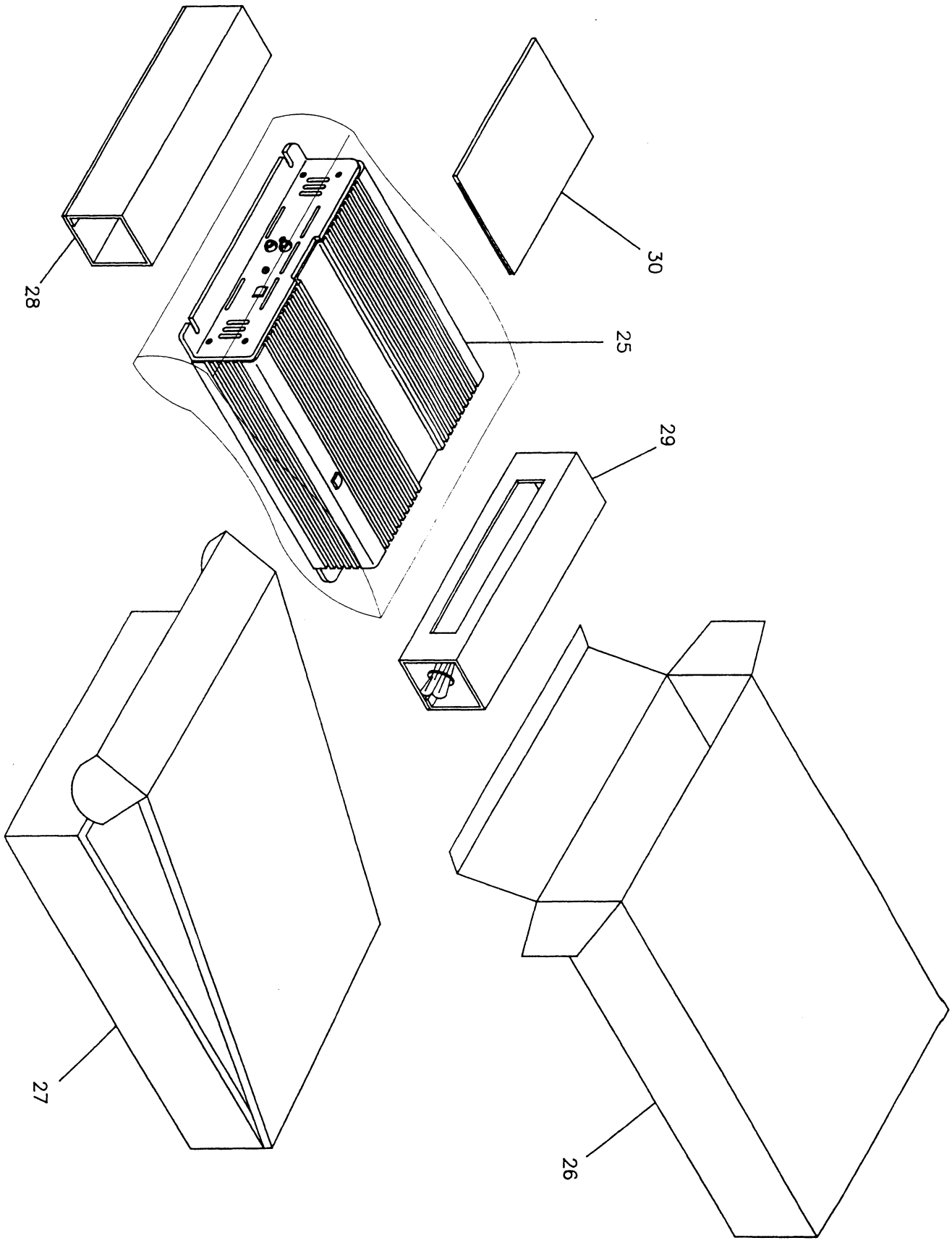
ST-50 Schematics



ST-150 Exploded View



ST-150 Package Exploded View

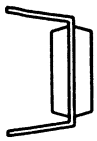


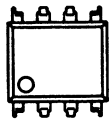
ST-150 Parts List

Part #	Reference #	Description	Quantity
		Mylar Capacitors	
1-10-101	C34, C35, C40, C41, C49	100V ±10% 0.1μF	5
1-10-369	C32, C33, C42	100V ±10% 0.068μF	3
1-10-201	C45, C47, C50	100V ±10% 0.01μF	3
1-10-468	C9, C20	100V ±10% 0.0068μF	2
1-10-447	C52	100V ±10% 0.0047μF	1
1-10-301	C51	100V ±10% 0.001μF	1
		Electrolytic Capacitors	
1-12-002	C27	50V ±20% 5x11 0.22μF	1
1-12-004	C31	50V ±20% 5x11 0.47μF	1
1-12-110	C1, C2, C4, C12, C13, C15, C23,C24, C25	16V ±20% 5x11 10μF	9
1-12-133	C7, C18, C46	16V ±20% 5x11 33μF	1
1-12-147	C28, C29	16V ±20% 5x11 47μF	2
1-12-210	C30, C48, C53	16V ±20% 6x11 100μF	3
1-12-247	C5, C16	25V ±20% 10x16 470μF	2
1-12-522	C36, C37, C38, C39, C43, C44	35V ±20% 16x30 2200μF 85c	6
		Ceramic Capacitors	
1-16-005	C3, C14, C26	50V ±10% 10pF	3
1-16-110	C6, C8, C17, C19	50V ±10% 100pF	4
1-16-125	C10, C11, C21, C22	50V ±10% 250pF	4
		Resistors	
1-18-147	R68, R71, R72, R75	1/4W ±5% PS 47Ω	4
1-18-215	R76, R77	1/4W ±5% PS 150Ω	2
1-18-233	R8, R26, R42, R46	1/4W ±5% PS 330Ω	4
1-18-247	R69, R70, R73, R74	1/4W ±5% PS 470Ω	4
1-18-275	R41, R45	1/4W ±5% PS 750Ω	2
1-18-310	R1, R9, R10, R11, R19, R27, R28, R9, R37, R39, R80	1/4W ±5% PS 1KΩ	12
1-18-322	R2, R12, R20, R30, R64, R65	1/4W ±5% PS 2.2KΩ	6
1-18-333	R40	1/4W ±5% PS 3.3KΩ	1
1-18-347	R49	1/4W ±5% PS 4.7KΩ	1
1-18-356	R16, R34, R43, R47, R86	1/4W ±5% PS 5.6KΩ	5
1-18-362	R81	1/4W ±5% PS 6.2KΩ	1
1-18-368	R84	1/4W ±5% PS 6.8KΩ	1
1-18-410	R4, R6, R7, R22, R24, R25, R38	1/4W ±5% PS 10KΩ	7
1-18-412	R44, R48, R78	1/4W ±5% PS 12KΩ	3
1-18-418	R56, R60	1/4W ±5% PS 18KΩ	2
1-18-422	R3, R21	1/4W ±5% PS 22KΩ	2
1-18-430	R83	1/4W ±5% PF 30KΩ	1
1-18-433	R57, R79	1/4W ±5% PS 33KΩ	2
1-18-447	R59, R85	1/4W ±5% PS 47KΩ	2
1-18-456	R51, R53, R55, R58	1/4W ±5% PS 56KΩ	4
1-18-468	R50	1/4W ±5% PS 68KΩ	1
1-18-533	R5, R23	1/4W ±5% PS 330KΩ	2
1-18-633	R52, R54	1/4W ±5% PF 3.3MΩ	2
1-19-110	R13, R31, R62, R63, R87	1/2W ±5% PS 10Ω	5
1-20-210	R82	1W ±5% METAL FILM 100Ω	1
1-20-220	R66	1W ±5% METAL FILM 200Ω	1
1-20-230	R61, R67	1W ±5% METAL FILM 300Ω	2
1-23-022	R17, R18, R35, R36	5W ±5% WIRE WOUND 0.22Ω	4
		PCB	
ST150-1	MAIN PCB	ST150-1 MAIN P.C.B.	1
1-25-150	LD1	RED LED MRB31D	1
		F. Vr.	
1-26-016	VR1	V. RES. 20KAx2 (RK1241210)	1
		P. Switch	
1-27-150	SW1	PUSH SWITCH 2P2T	1
		TH1	
1-27-403	TH1 SW	THERMAL SWITCH	1
1-28-002	RELAY	RELAY (OMI-SS-224DM)	1
		MK045	
1-01-405	T3	EE41 FERRITE CHOKE COIL	1
		Coil	
1-01-406B	T1, T2	T080-26 IRON POWDER CHOKE	2
1-28-202A	T4	BALUN CHOKE	1

Part #	Reference #	Description	Quantity
		Rectifiers	
1-05-007	D13	CTU 21R	1
1-05-008	D14	CTU 21S	1
		Diodes	
1-05-006	D12	1N5400	1
1-05-001	D7, D8, D9, D11	1N4001	4
1-05-009	D3, D4, D5, D6	1N4148	4
		Zener	
1-06-005	D1, D2, D10	1/2W ±5% 15V	3
		FET	
1-07-200	Q14, Q15, Q16, Q17	IRF540	4
		P. Transistors	
1-08-009	Q4, Q9	TIP 141	2
1-08-010	Q5, Q10	TIP 146	2
		Transistors	
1-07-104	Q1, Q6	2N 3906	2
1-07-107	Q2, Q7, Q11, Q12	MPS A06	4
1-07-109	Q13	MPS A56	1
		IC	
1-09-421	Q1, Q2	BA4560	2
1-09-412	Q3	TA 7317P	1
1-09-561	Q4	GL494	1
		Panel	
3-59-004	1	2033-0 HEAT SINK 9 INCH	1
3-59-001	2	2033-1 FRONT PANEL	1
3-59-002	3	2033-2 REAR PANEL	1
3-59-003	4	2033-3 BOTTOM COVER	1
3-06-008	5	2018-8 SWITCH KNOB	1
3-06-009	6	2018-9 BADGE PINK	1
3-06-005	7	2018-5 4POLE T'NAL HOLDER	1
3-06-015	8	2033-7 3POLE T'NAL HOLDER	1
		Brackets	
3-06-16	9	2033-6C C. W. BRACKET	1
3-06-006	10	2018-6C C. W. BRACKET	1
1-47-112	11	PA-100 TRANSISTOR BKT.	4
1-67-011	12	1536-11 TRANSISTOR BKT.	1
1-37-130	13	M3 FLAT WASHER ZNC BKT.	6
1-37-230	14	M3 SPRING WASHER ZNC BKT.	6
		S&W	
1-35-314	15	3x14 TTB PH ZNC BKT	6
1-35-307	16	TORX T10 TTB-BTN 3x10 TIN	8
1-35-308	17	TTB-PH 3x10 TIN RCA	1
1-35-305	18	MSB 3x6 FOR COVER	6
1-35-381	19	PAN HEAD MACHINE SCREW 3x20	3
1-37-230	20	M3 SPRING WASHER ZNC BKT.	1
1-37-030	21	M3 NUT FOR TERMINAL	2
1-33-206	22	PAN HEAD TAPPING SCREW 2x6	4
1-24-007	23	BIND HEAD MACHINE SCREW 3x7	1
3-24-009	24	MSP 3x9 TIN FOR TERMINAL	6
		Packing Parts List	
ST150-2	25	ST150A SET	1
ST150-3	26	GIFT BOX	1
2033-P1	27	INNER BOX (BIG)	1
	28,29	INNER BOX (SMALL)	1
1-29-107	29-1	FUSE 20A	1
1-36-120	29-2	PAN HEAD TAPPING SCREW 10x5/8	4
1-37-150	29-3	PLAIN WASHER M5	4
1-37-250	29-4	SPRING WASHER M5	4
ST150-4	30-1	INSTRUCTION MANUAL	1
ST150-5	30-2	WARRANTY CARD	1

IC's, Transistors, and Measurements





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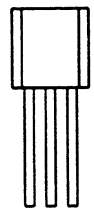
4560D



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MPS-A56
9014C
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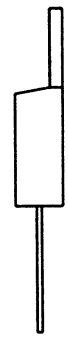
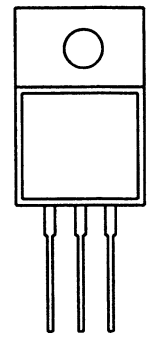
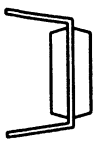
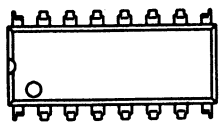




CTU-21S
CTU-21R
IRF540





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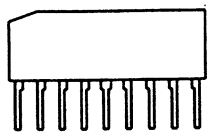

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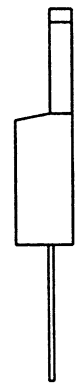
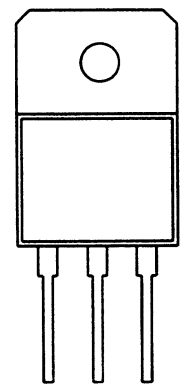




TIP141
TIP146

ST-150
TYPICAL AT IC PINS

MEASUREMENT REQUIRED
MEASUREMENT METER: DIGITAL MULTI METER
POWER SOURCE: DC +14.4V
INPUT: NO SIGNAL INPUT

PIN NO. / IC NO.	1	2	3	4	5	6	7	8
IC1	0V	0V	0V	-15V	0V	0V	0V	+15V
IC2	0V	0V	0V	-15V	0V	0V	0V	+15V

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9
IC3	0V	-.04V	-.04V	-.04V	-.72V	+0.9V	-.03V	+1.35V	+2.9V

PIN NO. / IC NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC4	0V	2.3V	0.07V	0.03V	1.5V	3.5V	0V	14.3V	5.4V	5.4V	14.3V	13.6V	4.9V	4.9V	3.8V	2.3V

TYPICAL AT TRANSISTOR PINS

TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	C	B	E
Q1, Q6	-28V	-1.3V	-0.7V
Q2, Q7	-0.85V	-28V	-28V
Q3, Q8	0.85V	0.4V	-0.85V
Q13	-.03V	28V	28V

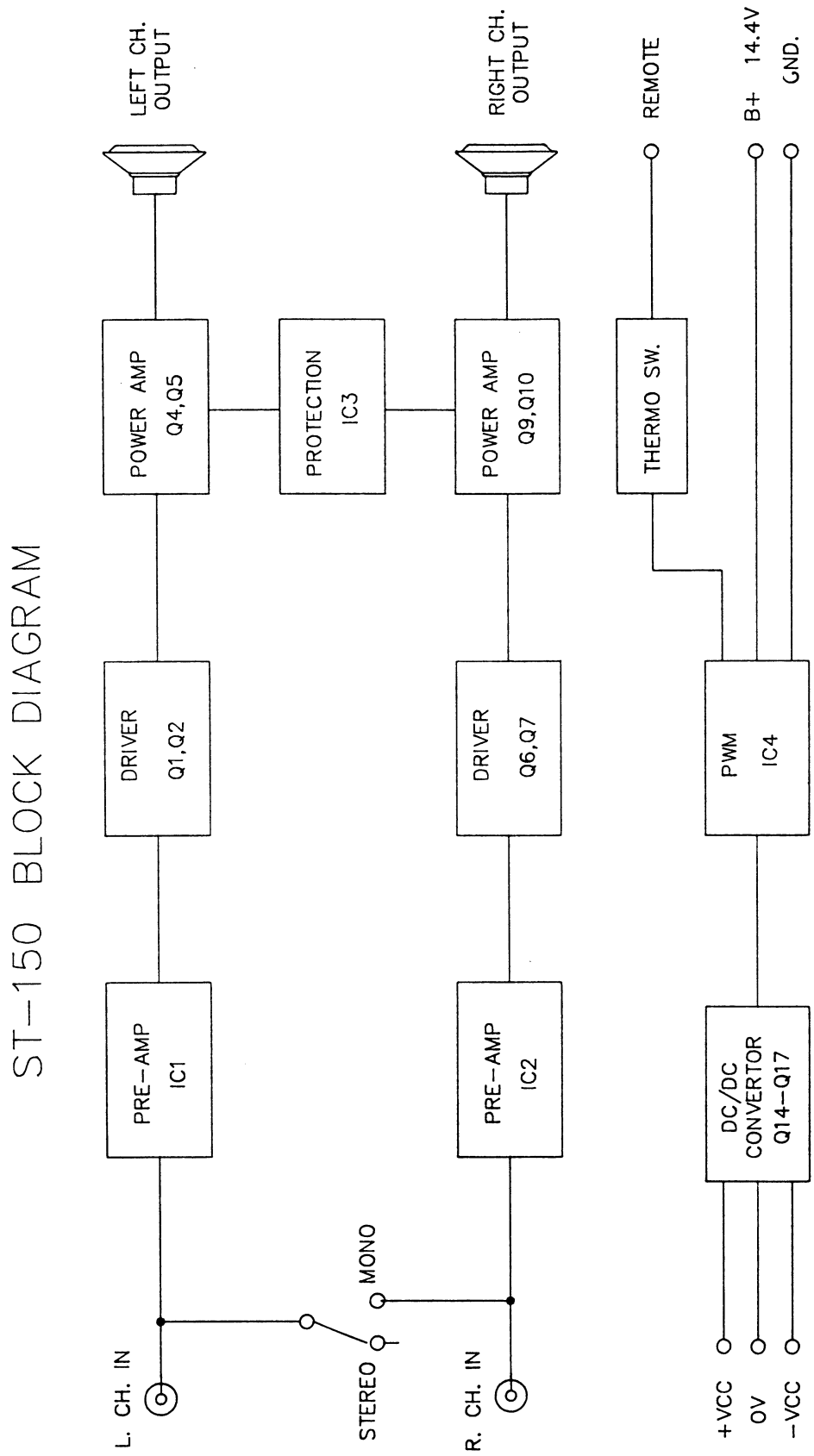
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	E	B	C
Q11	-.03V	-.03V	28V
Q12	-.04V	.04V	28V
Q4, Q9	-.04V	0.85V	28V
Q5, Q10	-.04V	0.85V	-28V

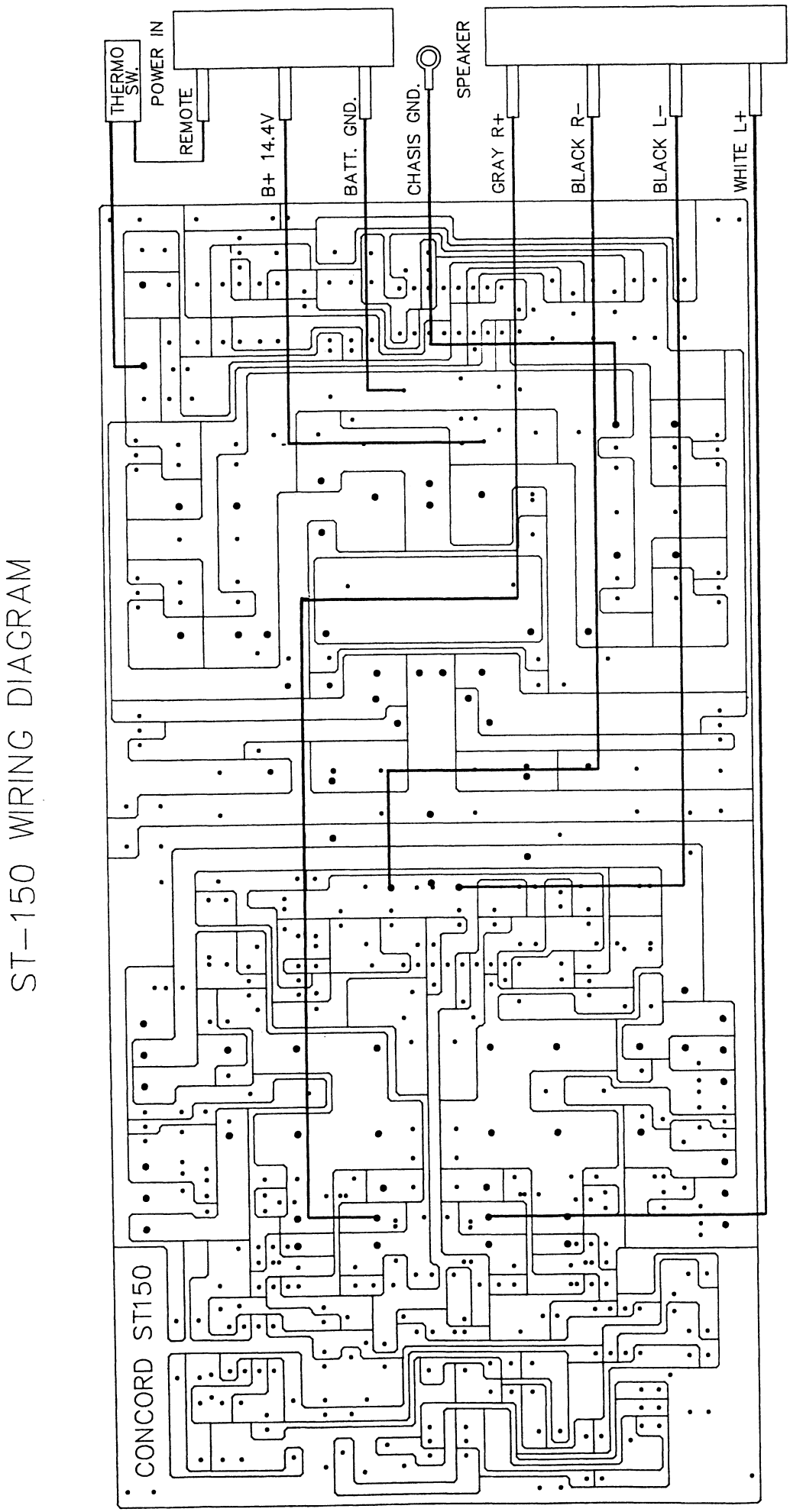
TRANSISTORS (UNIT: VOLTAGE)

PIN NO. / IC NO.	G	S	D
Q14, Q15	4.9V	0V	14.4V
Q16, Q17	4.9V	0V	14.4V

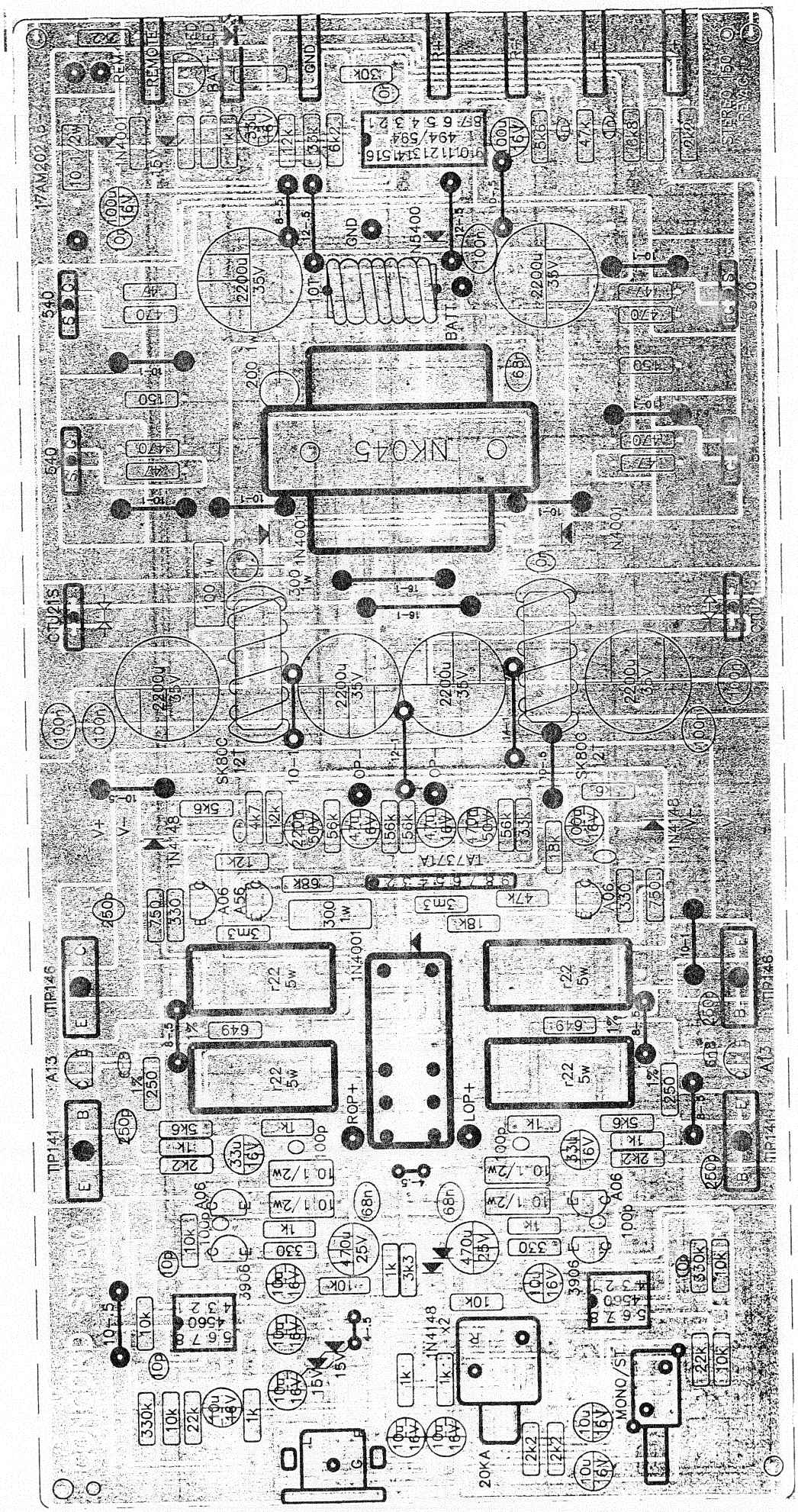
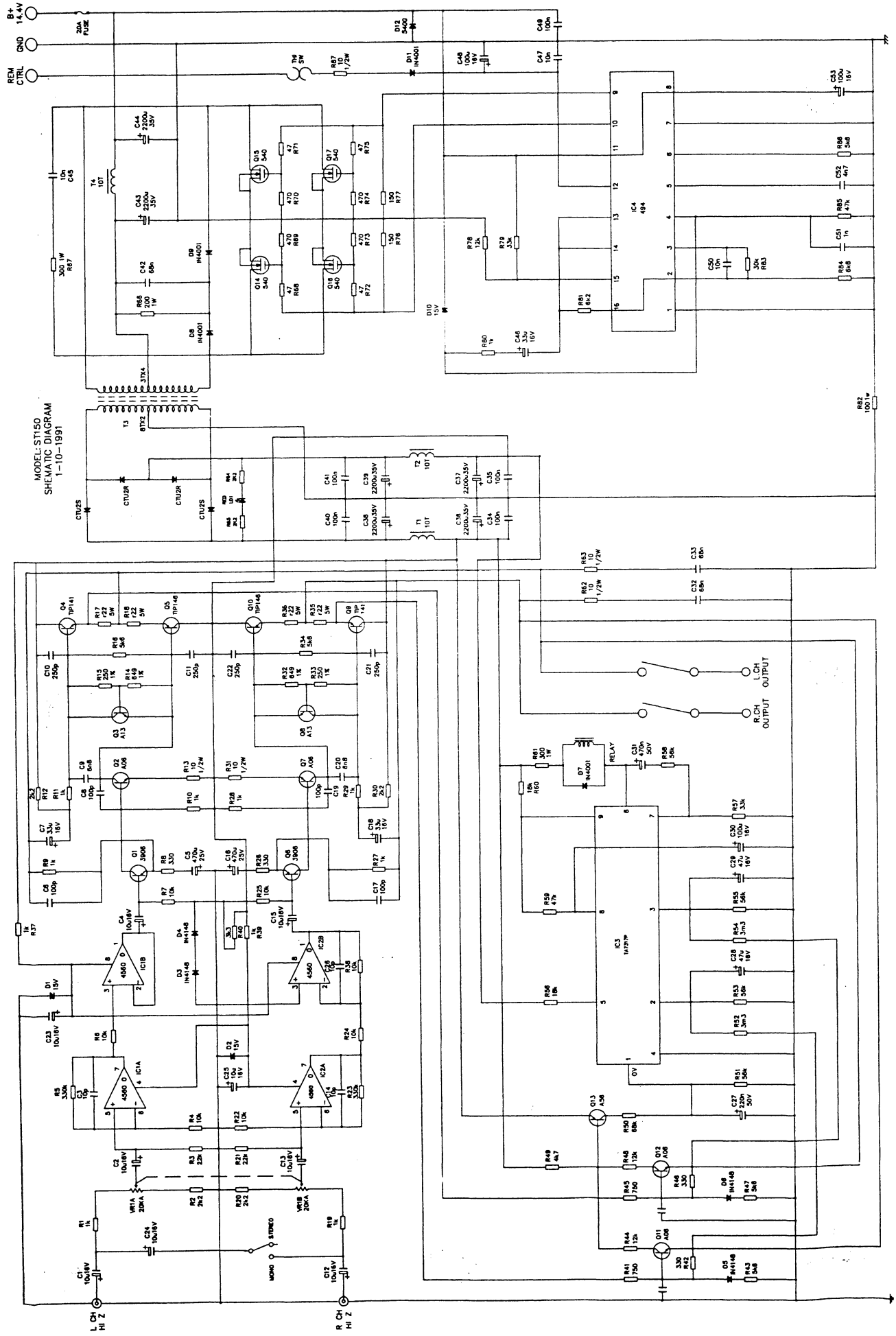
ST-150 Block Diagram



ST-150 Wiring Diagram



ST-150 Printed Circuit Board



ST-150 Schematics